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RCC

DOCUMENT 365-83

WHITE SANDS MISSILE RANGE
NEW MEXICO

RANGE REFERENCE ATMOSPHERE
0-70 KM ALTITUDE

AUGUST 1983

METEOROLOGY GROUP
RANGE COMMANDERS COUNCIL

WHITE SANDS MISSILE RANGE
KWAJALEIN MISSILE RANGE
YUMA PROVING GROUND

PACIFIC MISSILE TEST CENTER
NAVAL WEAPONS CENTER
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FOREWORD - see attached.

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DOCUMENT 365-83

WHITE SANDS MISSILE RANGE,
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RANGE REFERENCE ATMOSPHERE
0-70 KM ALTITUDE

August 1983

Prepared by

Range Reference Atmosphere Committee
Meteorology Group
Range Commanders Council

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White Sands Missile Range, New Mexico 88002

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LIST OF ORGANIZATION ACRONYMS

AD	Armament Division
AFFTC	Air Force Flight Test Center
AFSC	Air Force Systems Command
AFSC/AFGL	AFSC/Air Force Geophysics Laboratory
AFSC/SD	AFSC/Space Division
AFSCF	Air Force Satellite Control Facility
AFTFWC	Air Force Tactical Fighter Weapons Center
AWS	Air Weather Service
BMD	Ballistic Missile Division
DOD	Department of Defense
DOE	Department of Energy
DOE/NTS	DOE/Nevada Test Site
DPG	Dugway Proving Ground
ESMC	Eastern Space and Missile Center
ETR	Eastern Test Range
KMR	Kwajalein Missile Range
NASA	National Aeronautics and Space Administration
NASA/MSFC	NASA/Marshall Space Flight Center
NASA/WFC	NASA/Wallops Flight Center
NOAA	National Oceanic and Atmospheric Administration
NWC	Naval Weapons Center
PMTC	Pacific Missile Test Center
USA/DTC	U.S. Army/Deseret Test Center
USAECOM	U.S. Army Electronics Command
USAFETAC	United States Air Force Environmental Technical Applications Center

UTTR	Utah Test and Training Range
WSMC	Western Space and Missile Center
WSMR	White Sands Missile Range
WTR	Western Test Range
YPG	Yuma Proving Ground
6585TG	6585th Test Group
TSCF	Targeting Systems Characterization Facility

FOREWORD

Atmospheric parameters are essential to the research and development of missiles and aerospace vehicles. In the early 1960's, the need was recognized for realistic atmospheric models derived in a consistent manner for each of the several major test ranges. An atmospheric model derived from statistical data for a particular geographical location is referred to as a reference atmosphere.

The first Range Reference Atmosphere (RRA) was issued in 1963 by the Inter-Range Instrumentation Group (IRIG) for Cape Kennedy, Florida, and was followed by additional publications for several ranges up to 1974. Since that time, improved upper air data bases have become available from which to develop the RRA. These resulted from the extended period of records and from improvement in the upper air measuring program by rocketsondes for altitudes above the rawinsonde ceiling of 30 km. Revised and improved RRAs are justified for the following reasons:

1) Needs for more definitive statistical atmospheric models have arisen because of changes and advances in aerospace technology. The Space Transportation System (Space Shuttle) is one example.

2) Most ranges now have an extended and improved upper air data base from which to develop a more definitive RRA.

3) There are requirements for RRAs for new ranges and range sites.

4) There have been scientific advances in understanding the upper atmospheric structure and physical relationships.

5) Advances in statistical modeling techniques have been made because of the general availability of high-speed electronic computers. These have led to the adoption of advanced concepts in atmospheric modeling.

For these reasons, the Range Reference Atmosphere Committee (RRAC) was tasked by the Range Commanders Council Meteorology Group (RCC MG) to establish new and improved RRAs. The purpose, scope, and objectives of this task are outlined in the following paragraphs.

Purpose: This committee, Task MG-1, establishes RRAs for the several ranges as provided by the RCC. An RRA is a model of the Earth's atmosphere over a geographical location of interest, for use by DOD and other U.S. Government range users. The RRA is used to provide planning data for evaluating environmental constraints for the particular configurations of environment-sensitive systems and components being developed or undergoing tests.

Scope: Using the best available upper atmosphere data base to include rawinsonde, rocketsonde and possibly other high-altitude data sources for the range location, the task is to establish a model of certain statistics for wind and thermodynamic quantities derived in a uniform manner and published in a standardized format.

Objectives: The wind statistics shall be, insofar as practical, modeled to be consistent with rigorous mathematical probability properties of the multivariate normal probability theory. The thermodynamic quantities statistics shall be, insofar as practical, modeled to be consistent with the hydrostatic equation, the equation of state, and the probability principles that are related through these physical equations. The document shall serve as an authoritative source of information and as an atmospheric model for a particular range. The first in the series of revised RRAs to be published is for Kwajalein Missile Range (KMR) (publication date December 1982). The altitude range required for KMR is 0 to 70 km. The order of priority for the subsequent publications is:

	Range	Altitude Range Required
1.	AFFTC/Edwards AFB, CA	0 - 70 km[a]
2.	ESMC/Cape Canaveral AFS, FL	0 - 70 km
3.	WSMC/Vandenberg AFB, CA	0 - 70 km[a]
4.	WSMR/White Sands, NM	0 - 70 km
5.	PMTC/Point Mugu, CA	0 - 70 km
6.	UTTR/Dugway (Michael AAF), UT	0 - 30 km[b]
7.	AD/Eglin AFB, FL	0 - 30 km
8.	ESMC/Ascension Island	0 - 70 km (Terminates at 66 km because of insufficient data)
9.	NASA/Wallops Flight Center, VA	0 - 70 km
10.	Taquac (Guam)	0 - 30 km
11.	PMTC/Barking Sands, HI	0 - 70 km

In keeping with the RCC's objective of standardization, the modeling techniques, basic text, and tabulation format are to be the same for all RRAs. These new and revised RRAs present not only the mean values of the thermodynamic quantities (pressure, temperature, virtual temperature, and density), but also include statistical measures for the dispersion (i.e., standard deviations and skewness coefficients). New quantities presented are water vapor pressure and dewpoint temperature. The statistical modeling for the wind is entirely new. The new approach uses the properties of the bivariate normal probability distribution function.

a. Use rocketsonde data from PMTC/Point Mugu for altitudes above 30 km.
b. Consider augmenting data base from Ely or Salt Lake City.

All final computations were performed by the United States Air Force Environmental Technical Applications Center (USAFETAC) in response to a task from Eastern Space and Missile Center (ESMC).

The text was prepared jointly by USAFETAC and the NASA/George C. Marshall Space Flight Center's Space Sciences Laboratory, Atmospheric Sciences Division. The editing and preparation of the draft manuscript were performed by the NASA/MSFC organization.

The cochairmen express their gratitude to all RRAC members and their respective colleagues who have made significant technical contributions to the establishment of these RRAs.

Special thanks are tendered to Lt. B. Novograd for his dilligence in forming the many computations and the development of the primary tables, I through IV. Special thanks goes to Lt. F. Wirsing for editing and formulating the equations for the derivable thermodynamic equations. These gentlemen performed this outstanding work under the direction of Major B. Lilius, USAFETAC.

Grateful acknowledgment goes to Mrs. Annette Tingle, NASA/MSFC, for editing the draft manuscript.

The RRAC consists of representatives from the U.S. Air Force, U.S. Army, National Aeronautics and Space Administration, U.S. Navy, and National Oceanic and Atmospheric Administration. The committee members for the RRA for the first publication are:

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O. H. Daniel, ESMC
R. de Violini, PMTC
F. G. Finger, NOAA/NWS
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CHAPTER I. INTRODUCTION

A. Definition and Purpose of the Range Reference Atmosphere

A.1 Definition

A reference atmosphere is a statistical model of the Earth's atmosphere derived from upper air measurements over a particular geographical location. Hence, these Range Reference Atmospheres (RRAs) are atmospheric models developed by the Range Reference Atmosphere Committee (RRAC) in response to a task by the Range Commanders Council Meteorology Group (RCC MG) and published by the RCC Secretariat. The RCC MG, formerly called the Inter-Range Instrumentation Group/Meteorology Working Group (IRIG/MWG), published a series of RRAs during the period 1963 through 1974.

A.2 Purpose

A series of revised and expanded RRAs are to be published for locations of interest to the RCC. These publications are to serve as authoritative reference sources on certain upper air statistics and as atmospheric models for particular range sites. The technical usefulness of these documents for the ranges, range users, U.S. aerospace industries, and the scientific community is recognized because of the standardization of the development techniques and the presentation of the tabulations.

B. Scope of the Range Reference Atmosphere and Arrangement of Tables

B.1 Scope

The RRA contains tabulations for monthly and annual means, standard deviations, and skewness coefficients for windspeed, pressure, temperature, density, water vapor pressure, virtual temperature, and dewpoint temperature; the means and standard deviations for the zonal (U) and meridional (V) wind components; and the linear (product moment) correlation coefficient between the wind components. These statistical parameters are tabulated at the station elevation, at 1-km intervals from sea level to 30 km, and at 2-km intervals from 30 to 90 km. The wind statistics are given at approximately 10 m above the station elevations and at altitudes with respect to mean sea level thereafter. For those range sites without rocketsonde measurements, the RRAs terminate at 30 km altitude, or they are extended, if required, when rocketsonde data from a nearby launch site are available. There are four sets of tables for each of the 12 monthly reference periods and the annual reference period.

B.2 Arrangement of Tables

The statistical parameters for the RRA models are presented in four tables, as outlined in the following paragraphs.

Table I contains all the wind statistical parameters. This table gives the monthly and annual means and standard deviations of the U and V wind components and the linear (product moment) correlation coefficient between these

two components; the mean, standard deviation and skewness coefficient of the windspeed; and the number of wind observations (sample size).

Table II contains the monthly and annual means, standard deviations, and skewness values of pressure, temperature, and density, and the number of observations used for each of these thermodynamic quantities.

Table III contains the monthly and annual means, standard deviations and skewness values of the water vapor pressure, virtual temperature and dewpoint, and the number of observations for each of these moisture-related quantities. The statistical parameters for water vapor pressure and dewpoint terminate at 15 km altitude. Above 15 km the statistical parameters for virtual temperature are considered to be the same as those for temperature.

Table IV contains the monthly and annual mean atmospheric models for the thermodynamic variables: pressure, virtual temperature, and density. This table is derived from the monthly and annual mean virtual temperature versus altitude (geometric) using the hydrostatic equation and the equation of state. Also presented is the geopotential height corresponding to the tabulated geometric altitudes.

The physical unit for all wind parameters is meters per second. The physical unit for pressure is millibars; for temperature and virtual temperature, degrees Kelvin; for density, grams per cubic meter; and for water vapor pressure, millibars. In all cases the skewness coefficient and the correlation coefficient between wind components are unitless. All reference to altitude is geometric altitude and is expressed in kilometers. All reference to height is geopotential height and has the unit geopotential meters or kilometers. All geometric altitudes and geopotential heights are with respect to mean sea level.

C. Data Quality Control Procedures

A small portion (less than 10 percent) of the soundings in the data base used to calculate the RRA tables contained erroneous data values. The soundings which contained these erroneous values were eliminated from the data base using the following procedures:

1) Soundings containing gaps in their height data greater than 200 mb were rejected. This step was taken because some soundings only contained height values at their "mandatory" pressure levels, which were occasionally missing, resulting in soundings with no height information at all.

2) An initial set of RRA statistics was computed using all the remaining soundings. This initial set of statistics was used to determine data limits for the temperature, pressure, U and V components of the wind, and the dewpoint (for the 0- to 30-km portion of the RRA) or the density (for the 30- to 90-km portion of the RRA). The lower (upper) data limits were set at the mean value for a specific parameter, minus (plus) six standard deviations of that quantity. One pair of data limits was computed for each of these parameters: month of the year and data level.

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3) This initial set of data limits was then used to screen the data base. All the soundings that contained values outside these data limits were rejected. A new RRA was then computed using the screened data base. This second RRA was used to generate a second set of data limits.

4) The second set of data limits was then used to screen the data base further. A new RRA was again generated. The skewness values in this RRA were then evaluated, according to empirical criteria specified in section II.A.3 of this document for the winds, and according to criteria in section III.A.3 for the thermodynamic quantities. If these criteria were satisfied, the new RRA was then used to generate a final set of data limits, which were used to control the quality of the data base for the final version of the RRA.

5) Occasionally, the third RRA that was generated did not satisfy all of the skewness criteria. This indicated that some incorrect values were still present in the data base. To complete quality control, steps 3 and 4 were repeated for additional iterations (usually one or two) until the resulting RRA satisfied the skewness criteria. At that point, a final set of data limits was generated. This final set of data limits was then used to control the quality of the data base and generate the final RRA.

D. Organization of the Chapters

Because there are plans to publish a series of RRAs, comments on the special organization of the document are in order. The RRA document is arranged in four chapters. Chapter I is the introduction. Chapter II, Wind Statistics and Models, contains the techniques used to arrive at the wind statistical parameters, table I, and the probability functions that are to be used as wind models to derive several wind statistics. Chapter III, Statistics of Thermodynamic Quantities and Models, contains the techniques used to arrive at the thermodynamic and moisture-related statistical parameters given in tables II and III and the atmospheric thermodynamic model presented in table IV. This chapter also contains sets of equations to calculate several atmospheric properties. Chapter IV contains the general conclusions and recommendations. These four chapters are reprinted without change for each documented RRA to assure consistency and for expediency in preparing the documentation. To account for variations particular to a specific RRA, two appendixes have been included. Appendix A, Examples of Wind Statistics, is designed to give a few illustrative examples of wind statistics for the specific RRA and cursory observations, comparisons, or comments on wind statistics. Appendix B, Range Specific Information, is designed to present specific information particular to the range, such as geographical location, data base, etc., and any cursory observations or comments on the thermodynamic quantities.

Read these appendixes! They are located as the last two units in the document because they may vary in length depending on the circumstances. Appendixes A and B and tables I, II, III, and IV are the only differences among the RRA documents published in this new RRA series.

CHAPTER II. WIND STATISTICS AND MODELS

A. General Considerations

A.1. Objectives

An objective of the RRA is to furnish minimum tabulation for the wind statistics. To meet this objective, the bivariate normal probability distribution was adopted as a statistical model for the wind treated as a vector quantity at the RRA data levels. Only five statistical parameters are required to completely describe this probability function. In Cartesian coordinates these parameters are the means and standard deviations of the two orthogonal components and the correlation coefficient between the two components. These five statistical parameters for the U and V (meteorological coordinates) components are given in table I. The statistical properties of the bivariate normal probability distribution are used to derive many wind statistics that are of interest to the ranges and range users. This procedure produces consistent wind statistics that are connected through rigorous mathematical probability functions. By using these functions, extensive tabulations of wind statistics are avoided.

The statistical properties of the bivariate normal probability distribution presented for the vector wind statistical model are:

1) The wind components are univariate normally distributed.

2) The conditional distribution of one component given a value of the other component is univariate normally distributed.

3) The windspeed is of the form of a generalized Rayleigh distribution.

4) The frequency distribution of wind direction can be derived.

5) The conditional distribution of windspeed given a value of wind direction (wind rose) can be derived.

6) The five tabulated wind statistical parameters with respect to the meteorological U and V coordinate system can be derived for any arbitrary rotation of the orthogonal axes.

The probability distribution functions and sets of equations to derive wind statistics for the previously stated properties of the vector wind model are presented in this chapter. Symbols used are summarized in table A. Illustrative examples are presented in appendix A. No attempt is made to give the derivation of the probability functions. The reader is referred to Smith (1976) for some derivations and several applications of the probability distribution properties for wind statistics.

A.2. Data Quality Control

The U and V components of the wind were used to generate data limits set at plus and minus six standard deviations from the mean for each of the

TABLE A. LIST OF SYMBOLS USED IN CHAPTER II

N - The number of wind measurements in table I

r - A general variable for the bivariate normal probability distribution in polar coordinates

R - A generalized Rayleigh variable used for derived windspeed probability distribution

R (U, V) - The linear (product moment) correlation coefficient between the zonal and meridional wind components in table I

SK (W) - Skewness parameter for windspeed in table I

S (U) - The standard deviation of the zonal wind component in table I

S (V) - The standard deviation of the meridional wind component in table I

S (W) - The standard deviation of windspeed in table I

t - A standardized normal variate used in text table B

U - The zonal wind component

UBAR - The mean value of the zonal wind component in table I

V - The meridional wind component

VBAR - The mean value of the meridional wind component in table I

W - Windspeed or modulus of wind vector, a scalar quantity

WBAR - The mean value of windspeed in table I

X - A general component variable or coordinate axis

Y - A general component variable or coordinate axis

$\bar{X}$ - A general component mean value in the [x,y] coordinate system

$\bar{Y}$ - A general component mean value in the [x,y] coordinate system

α (alpha) - Rotation angle for the [x,y] coordinate system

TABLE A. (concluded)

θ (theta) - Wind direction in the polar coordinate system

$\lambda_{(\ )}$ (Lambda) - A parameter in the bivariate normal probability distribution in text table C

ξ (Xi) - The mean value in the standardized normal probability distribution used in text table B

π (Pi) - Constant = 3.14159 ...

ρ (Rho) - The general linear correlation coefficient between the two component variables in the [x,y] coordinate system

σ_x, σ_y - The general standard deviations of the x and y component variables in the [x,y] coordinate system.

quantities. These data limits were used to screen the wind data base, as described in section I.C. The data base was considered to be free from errors under the following conditions:

1) The skewness of the windspeed was below 4.0 at data levels where the mean windspeed was less than 15 m/s, and

2) The skewness of the windspeed was below 2.5 at data levels where the mean windspeed was greater than 15 m/s.

A.3 Limitations

For the wind statistics, the correlation coefficients for like wind components and unlike wind components between altitude levels were not computed. Therefore, wind statistics with respect to altitude (profile) cannot be derived from the RRA statistics. For wind profile modeling techniques the user is referred to Smith (1976). However, the wind statistics at discrete altitudes are valid; all of the probability distribution functions given in chapter II can be derived from the five wind component statistical parameters contained in table I, and the derived distributions can be considered as wind models at discrete altitudes.

By convention, in the statistical literature Greek letters are used for population or theoretically known parameters, and sample estimates are denoted by English alphabetical letters or with a "hat" (^) over the Greek letters. In chapter II Greek letters are used for the variances and the linear correlation coefficient, and the means are denoted by $\overline{X}$ and $\overline{Y}$ when dealing with the bivariate normal distribution. It will always be understood that table I contains sample estimates of the statistical parameters and they are with respect to the meteorological U and V coordinate system.

B. Coordinate System and Computation of Statistical Parameters

B.1. Coordinate System

Wind measurements are recorded in terms of magnitude and direction. The wind direction is measured in degrees clockwise from true north and is the direction from which the wind is blowing. The wind magnitude (the modulus of the vector) is the scalar quantity and is referred to as windspeed or scalar wind. A statistical description that accounts for the wind as a vector quantity is appropriate and requires a coordinate system.

For the RRA the standard meteorological coordinate system has been chosen for the wind statistics, all tables of statistical parameters, and related discussions because the coordinate system used in aerospace and related applied fields has not always been consistent.

Using figure 1, the polar and Cartesian forms for the meteorological coordinate system are defined:

W = windspeed, scalar wind, or magnitude of the wind vector in meters per second.

θ = wind direction. θ is measured in degrees clockwise from true north and is the direction from which the wind is blowing.

U = zonal wind component, positive west to east, in meters per second.

V = meridional wind component, positive south to north, in meters per second.

The components θ and W define the polar form, and the U-V components define the Cartesian forms:

$$U = -W \sin\theta \quad , \quad 0 \leq \theta \leq 360° \tag{1}$$

$$V = -W \cos\theta . \tag{2}$$

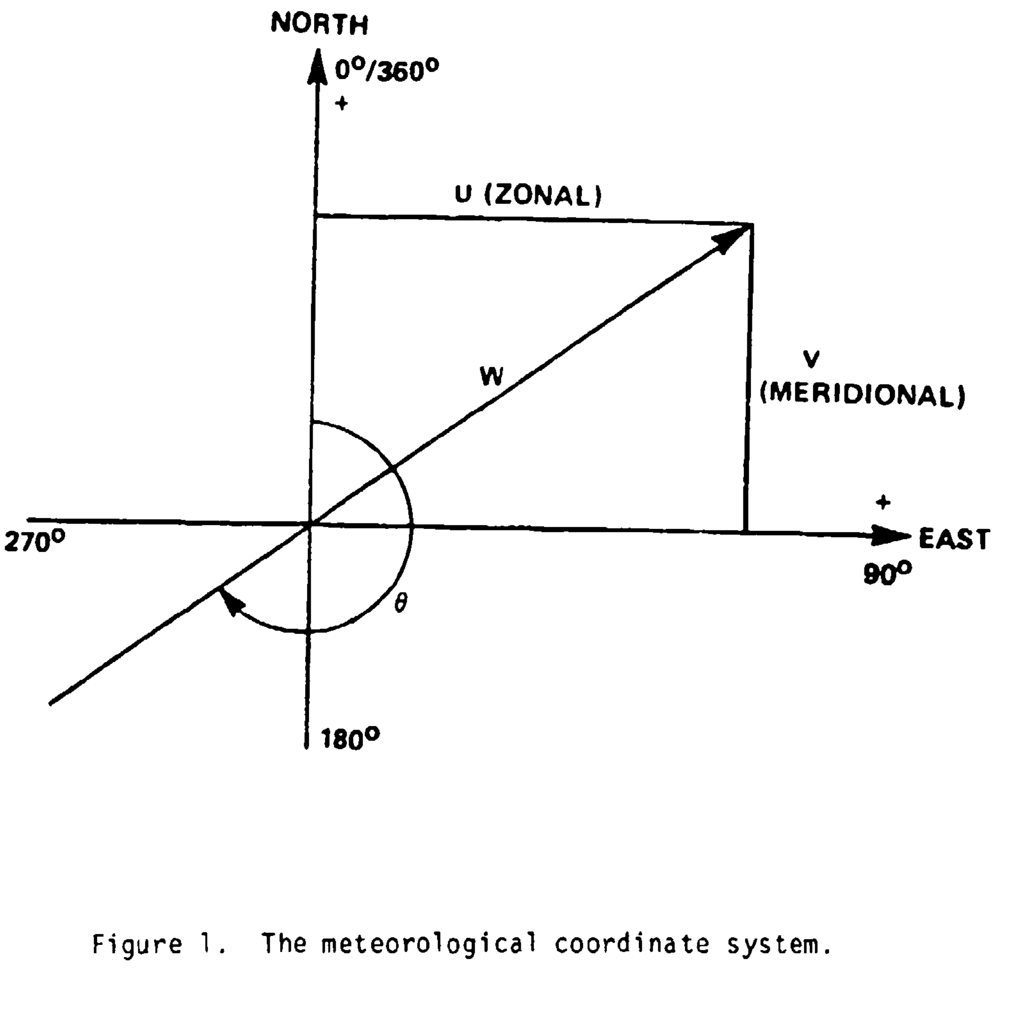

Figure 1. The meteorological coordinate system.

It is helpful to note the difference between the mathematical convention for a vector direction and the meteorological convention for wind direction:

$$\theta \text{ met} = 270 - \theta \text{ math} \tag{3}$$

when $0 \leq \theta$ math $\leq 270°$

$$\theta \text{ met} = 360 + (270 - \theta \text{ math})$$

when $270 \leq \theta$ math $\leq 360°$

B.2 Computation of Statistical Parameters

The wind statistical parameters in table I for the means and standard deviations of the U and V wind components and windspeed and the skewness parameter of windspeed were computed using the sums technique presented in chapter III.C.3. In addition, the linear (product moment) correlation coefficient between the U and V wind components, r (u,v) in table I, was computed. This correlation coefficient is defined as

$$r(u,v) = \frac{\sum_{i=1}^{n} (U_i - \bar{U})(V_i - \bar{V})}{N\ s(u) \cdot s(v)} \quad . \tag{4}$$

These statistical parameters are with respect to the Standard Meteorological Coordinate System.

C. Statistical Wind Models

C.1. Wind Component Statistics

The univariate normal (Gaussian) probability distribution function is used to obtain wind component statistics. In generalized notations, this probability density function (pdf) is

$$f(t) = \frac{e^{-\frac{t2}{2}}}{\sqrt{2\pi}} \quad , \tag{5}$$

where $t = X - \xi/\sigma_X$ is the standardized variate, with ξ defining the mean and σ_X the standard deviation. The probability distribution function (PDF) is

$$F(X) = \int_{-\infty}^{X} f(t)\, dt \quad . \tag{6}$$

Because this integral cannot be obtained in closed form, it is widely tabulated for zero mean and unit standard deviation. For a convenient reference for the RRA, selected values of F(X) are given in table B. To emphasize the connotation of probability, F(X) is shown in table B as $P\left\{X\right\}$. The t values in table B are used as multiplier factors to the standard deviation to express the probability that a normally distributed variable, X, is less than or equal to a given value as

$$P\left\{X \leq \text{mean} + t\ \sigma_x\right\} = \text{probability, p} \quad . \tag{7}$$

For example, when t = 1.6449, the probability that X is less than or equal to the mean plus 1.6449 standard deviations is 0.95. That value of X that is less than or equal to the mean plus 1.6449 standard deviations is called the 95th percentile value of X. Also given in table B are the numerical values to express the probability that X falls in the interval X_1 and X_2; i.e.,

$$P\left\{X_1 \leq X \leq X_2\right\} = \text{Interpercentile Range} \quad , \tag{8}$$

where

$$X_1 = \bar{X} - t\ \sigma_x$$

$$X_2 = \bar{X} + t\ \sigma_x \quad .$$

For t = 1.9602 the probability that X lies in the interval X_1 and X_2 is 0.95. The values of X_1 and X_2 in this example comprise the 95th interpercentile range.

For a normally distributed variable, the mode (most frequent value) and the median (50th percentile value) are the same as the mean value. The means and standard deviations of the U and V wind components from table 1 are used in equations (7) and (8) to compute the percentile values and interpercentile ranges of the U and V wind components. When equation (7) is illustrated on a normal probability graph, a straight line is formed.

C.2. The Vector Wind Model

Because wind is a vector quantity having direction and magnitude that can be expressed as two components in an orthogonal coordinate system, a probability model that describes the joint relationship is the bivariate normal probability distribution. In general component notation, the bivariate normal probability density function (BNpdf) is

TABLE B. VALUES OF t FOR STANDARDIZED NORMAL (UNIVARIATE) DISTRIBUTION FOR PERCENTILES AND INTERPERCENTILE RANGES

t	P(X)	X	$P\{X_1 \leq X \leq X_2\}$ (%)
-3.0000	0.00135	$\xi - 3.0000\,\sigma$	99.73 (0.27)
-2.5758	0.00500	$\xi - 2.5758\,\sigma$	99 (1.00)
-2.3263	0.01000	$\xi - 2.3263\,\sigma$	98 (2.00)
-2.2365	0.01266	$\xi - 2.2365\,\sigma$	97.468 (2.532)
-2.0000	0.02275	$\xi - 2.0000\,\sigma$	95.45 (4.55)
-1.9602	0.02500	$\xi - 1.9602\,\sigma$	95 (5)
-1.6449	0.05000	$\xi - 1.6449\,\sigma$	90 (10)
-1.2816	0.10000	$\xi - 1.2816\,\sigma$	80 (20)
-1.0000	0.15866	$\xi - 1.0000\,\sigma$	68.268 (31.732)
-0.8416	0.20000	$\xi - 0.8416\,\sigma$	60 (40)
-0.6745	0.25000	$\xi - 0.6745\,\sigma$	50 (50)
-0.2533	0.40000	$\xi - 0.2533\,\sigma$	20 (80)
0.0000	0.50000	ξ	
0.2533	0.60000	$\xi + 0.2533\,\sigma$	
0.6745	0.75000	$\xi + 0.6745\,\sigma$	
0.8416	0.80000	$\xi + 0.8614\,\sigma$	
1.0000	0.84134	$\xi + 1.0000\,\sigma$	
1.2816	0.90000	$\xi + 1.2816\,\sigma$	
1.6449	0.95000	$\xi + 1.6449\,\sigma$	
1.9602	0.97502	$\xi + 1.9602\,\sigma$	
2.0000	0.97725	$\xi + 2.0000\,\sigma$	
2.2365	0.98734	$\xi + 2.2365\,\sigma$	
2.3263	0.99000	$\xi + 2.3263\,\sigma$	
2.5758	0.99500	$\xi + 2.5758\,\sigma$	
3.0000	0.99865	$\xi \quad 3.0000\,\sigma$	

where $X_1 = \xi - t\sigma$
and $X_2 = \xi + t\sigma$

$$f(X,Y) = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho^2}}\left[\exp\frac{-1}{2(1-\rho^2)}\left\{\frac{(X-\bar{X})^2}{\sigma_x^2}\right.\right.$$

$$\left.\left.-\frac{2\rho(X-\bar{X})(Y-\bar{Y})}{\sigma_x\sigma_y}+\frac{(Y-\bar{Y})^2}{\sigma_y^2}\right\}\right] \quad -\infty \leqq X \leqq \infty \text{ and}$$

$$-\infty \leqq Y \leqq \infty \quad , \tag{9}$$

where the five parameters are $\bar{x},\bar{y}$, the component means; σ_x, σ_y, the component standard deviations; and ρ, the correlation coefficient between the two component variables, X and Y.

For many applications the interest is in determining the probability that a point $\{X,Y\}$ will fall within a contour of equal probability density. The exponential terms of equation (9), when set equal to a constant, λ^2, give a family of ellipses depending on the value of the constant. The ellipses have a common center at the point $\{\bar{X},\bar{Y}\}$. Integration of equation (9) over the region bounded by the contours of equal probability density gives

$$P(\lambda) = 1 - e^{\frac{-\lambda^2}{2(1-\rho^2)}} \quad . \tag{10}$$

Solving for λ^2 and replacing $P(\lambda)$ by p gives

$$\lambda^2 = -2(1-\rho^2)\ln(1-p) \quad . \tag{11}$$

Now define

$$\lambda_e = \sqrt{2}\sqrt{-\ln(1-p)} \quad . \tag{12}$$

For ready reference and comparisons, λ_e is shown in table 5 for selected values of p.

TABLE C. VALUES OF λ FOR BIVARIATE NORMAL DISBRIBUTION ELLIPSES AND CIRCLES

P(%)	λ_e (ellipse)	λ_c (circle)	P(%)	λ_e (ellispe)	λ_c (circle)
0.000	0.0000	0.0000	65.000	1.4490	1.0246
5.000	0.3203	0.2265	68.268	1.5151	1.0713
10.000	0.4590	0.3246	70.000	1.5518	1.0973
15.000	0.5701	0.4031	75.000	1.6651	1.1774
20.000	0.6680	0.4723	80.000	1.7941	1.2686
25.000	0.7585	0.5363	85.000	1.9479	1.3774
30.000	0.8446	0.5972	86.466	2.0000	1.4142
35.000	0.9282	0.6563	90.000	2.1460	1.5175
39.347	1.0000	0.7071	95.000	2.4477	1.7308
40.000	1.0108	0.7147	95.450	2.4860	1.7579
45.000	1.0935	0.7732	98.000	2.7971	1.9778
50.000	1.1774	0.8325	98.168	2.8284	2.0000
54.406	1.2533	0.8862	98.889	3.0000	2.1213
55.000	1.2637	0.8936	99.000	3.0348	2.1460
60.000	1.3537	0.9572	99.730	3.4393	2.4320
63.212	1.4142	1.0000	99.9877	4.2426	3.0000

$$\lambda_c = \sqrt{2}\,\sqrt{-\ln(1 - P)}$$

$$\lambda_c = \sqrt{-\ln(1 - P)}$$

The probability ellipse that contains p-percent of the wind vectors expressed in the most general form is the conic defined by

$$AX^2 + BXY + CY^2 + DX + EY + F = 0 \quad , \tag{13}$$

where

$$A = \sigma_y^{\,2}$$

$$B = -2\rho\sigma_x\sigma_y$$

$$C = \sigma_x^{\,2}$$

$$D = 2\sigma_x\sigma_y\ \rho\bar{Y} - 2\sigma_y^{\,2}\bar{X} = -\,(B\bar{Y} + 2A\bar{X})$$

$$E = 2\sigma_x\sigma_y\ \rho\bar{X} - 2\sigma_x^{\,2}\bar{Y} = -\,(B\bar{X} + 2C\bar{Y})$$

$$F = A\bar{X}^2 + C\bar{Y}^2 + B\bar{X}\bar{Y} - AC\,(1 - \rho^2)\,\lambda_e^{\,2} \quad ,$$

and

$$\lambda_e = \sqrt{2}\,\sqrt{-\ln\,(1 - \rho)} \quad .$$

For graphical presentations, the range of the variable is important in order to arrange the scale. The largest and smallest values of X and Y for a given probability ellipse, p, are given by

$$X_{L,S} = \bar{X} \pm \sigma_x\lambda_e \tag{14}$$

$$Y_{L,S} = \bar{Y} \pm \sigma_y\lambda_e \quad , \tag{15}$$

where, as, before, $\lambda_e = \sqrt{2}\ \sqrt{-\ln(1 - p)}$.

Although there are several approaches to graphing the probability ellipses, the following procedure is advantageous for electronic computer plotting. In establishing the computer plotting program, the sample estimates for $\bar{X}, \bar{Y}$, σ_x, σ_y, and ρ are constants in equation (13). The user makes the choice of probability ellipses desired. Thus, p in equation (12) is programmed as a parameter. The largest and smallest values for X and Y are computed by equations (14) and (15) for the largest probability ellipse selected. This sets the graphical scale. Values of X within the range of "X smallest" to "X largest" are obtained by incrementing X between these limits. Using the quadratic equation, a solution for Y of equation (13) is made and plotted for each value of X. The centroid $(\bar{X}, \bar{Y})$ for the family of probability ellipses is plotted as a point. Labeling and other identification complete the plotting program.

For a given probability, equation (13) defines an ellipse that contains p-percent of the points X,Y. Since the entire area under the bivariate normal density function [equation (9)] is unity, upon integration for a given probability ellipse, that given ellipse contains p-percent of the total area. In the wind statistics, p-percent of the wind vectors fall within the specified probability ellipse. From this point of view, a specified probability ellipse gives the joint probability that p-percent of the U-V components lie within the given ellipse.

When $\sigma_x^2 = \sigma_y^2 = \sigma^2$ and $\rho = 0$ in the bivariate normal distribution, the probability ellipses of equation (13) reduce to circles whose centers are at the means $\bar{X}, \bar{Y}$. The radii of the probability circles are $\sigma_{V1}\lambda_c$, where

$$\sigma_{V1} = \sqrt{2\sigma^2} \qquad (16)$$

and

$$\lambda_c = \sqrt{-\ln(1 - p)} \quad . \qquad (17)$$

Values for λ_c for selected probabilities, p, are given in table C.

Because this function is simple, it can easily be graphed manually. However, the generalized plotting technique for electronic computer plotters, as represented by equation (13), can be advantageously used.

C.3. Derived Distributions for Wind Statistics

In this subsection the probability distribution functions and sets of equations are presented to derive certain probability distribution functions for wind statistics. These derived probability distributions are:

1) The conditional distribution of wind components

2) The generalized Rayleigh distribution for windspeed

3) The distribution for wind direction

4) The conditional distribution of windspeed given a wind direction (wind rose).

The required five statistical parameters for these derived distributions for wind statistics are given in table I.

C.3.1 The Conditional Distribution of Wind Components

Given that two random variables X and Y are bivariate normally distributed, the conditional distribution $f(Y|X)$ is read as f(Y) given X, and likewise $f(X|Y)$ is read as f(X) given Y. The conditional probability distribution function $F(Y|X)$ has the mean $E(Y|X)$ and variance $\sigma^2_{(x|y)}$, where

$$E(Y|X^*) = \bar{Y} + \rho\left(\frac{\sigma_y}{\sigma_x}\right)(X^* - \bar{X}) \tag{18}$$

and

$$\sigma^2_{(y|x^*)} = \sigma_y^2 (1 - \rho^2) \quad . \tag{19}$$

The conditional standard deviation is

$$\sigma_{(y|x^*)} = \sigma_y \sqrt{1 - \rho^2} \quad . \tag{20}$$

By interchanging the variables and parameters, the conditional distribution function for $F(X|Y^*)$ has the conditional mean

$$E(X|Y^*) = \bar{X} + \rho \left(\frac{\sigma_x}{\sigma_y} \right) (Y^* - \bar{Y}) \quad , \tag{21}$$

conditional variance

$$\sigma^2_{(x|y^*)} = \sigma_x^2 (1 - \rho^2) \quad , \tag{22}$$

and conditional standard deviation

$$\sigma_{(x|y^*)} = \sigma_x \sqrt{1 - \rho^2} \quad . \tag{23}$$

The preceding conditional probability distribution functions are univariate normal distributions for a (fixed) given value for one of the bivariate normal variables. Thus, the t-values given in table 8 are applicable for conditional probability statements. For example,

$$F(Y|X^*) = E(Y|X^*) + t\sigma_{(y|x^*)} \quad . \tag{24}$$

For $t = 1.6449$ there is a 95 percent chance that Y is less than or equal to $\bar{Y} + 1.6449\ \sigma_{(y|x^*)}$ given that $X = X^*$. In symbols this statement reads

$$P\left\{ Y \leq E(Y|X^*) + 1.6449\ \sigma_{(y|x^*)} \ |X = X^* \right\} = 0.9500 \quad . \tag{25}$$

Interval probability statements can also be made; namely,

$$P\left\{ Y_1 = E(Y|X^*) - t\sigma_{(y|x^*)} \leq Y \leq Y_2 = E(Y|X^*) + t\sigma_y \ |X = X^* \right\}$$

where X* can take on any fixed value of X, but a convenient arrangement is to let $X^* = \bar{X} \pm t\sigma_x$.

The close connection of the regression function of Y on X to the conditional mean for the bivariate normal distribution is noted: namely,

$$Y = \bar{Y} + \rho\left(\frac{\sigma_y}{\sigma_x}\right)(X - \bar{X}) \quad . \tag{26}$$

Similarly, the regression function of X on Y is

$$X = \bar{X} + \rho\left(\frac{\sigma_y}{\sigma_x}\right)(Y - \bar{Y}) \quad . \tag{27}$$

These are linear functions and express the same results as would be obtained from a least-squares regression line.

C.3.2. The Generalized Rayleigh Distribution for Windspeed

If two random variables, X and Y, are bivariate normally distributed, then the probability distribution for the modulus, R, can be derived in terms of the five parameters that define the bivariate normal distribution.

$$R = \sqrt{X^2 + Y^2} \tag{28}$$

The distribution of R so derived is called a generalized Rayleigh distribution because there are no restrictions on the parameters. For applications to the RRA, the variable R is recognized as windspeed or the modulus of the wind vector.

The probability density function for R is expressed as

$$f(R) = a_0 R e^{-a_1 R^2}\left[I_0(a_2 R^2)\, I_0(a_3 R) + 2\sum_{k=1}^{\infty} I_k(a_2 R^2)\, I_{2k}(a_3 R)\cos 2k\psi \right] R \geq 0 \quad . \tag{29}$$

The functions, $I_0(\cdot)$, $I_k(\cdot)$, and $I_{2k}(\cdot)$ are the modified Bessel functions of the first kind for zero order, kth order, and 2kth order. The coefficients are

$$a_0 = \exp\left[-\frac{1}{2}\left\{\frac{\bar{X}^2}{\sigma_a^2} + \frac{\bar{Y}^2}{\sigma_b^2}\right\}\right] \bigg/ \sigma_a\sigma_b \quad .$$

where σ_a^2 and σ_b^2 are the rotated variances to produce zero correlation between X and Y. σ_a and σ_b are the positive and negative roots[1] of the expression

$$\sigma^2_{(+,-)} = \frac{1}{2}\left\{\sigma_x^2 + \sigma_y^2 \pm \left[(\sigma_x^2 + \sigma_y^2)^2 - 4\sigma_x^2\sigma_y^2(1 - \rho^2)\right]^{1/2}\right\} \quad ,$$

$$a_1 = (\sigma_x^2 + \sigma_y^2)/4(1 - \rho^2)\ \sigma_x^2\sigma_y^2 \quad ,$$

$$a_2 = \frac{\left[(\sigma_x^2 - \sigma_y^2)^2 + 4\rho^2\sigma_x^2\sigma_y^2\right]^{1/2}}{4(1 - \rho^2)\ \sigma_x^2\sigma_y^2} \quad ,$$

$$a_3 = \left[\left(\frac{\bar{X}}{\sigma_a^2}\right)^2 + \left(\frac{\bar{Y}}{\sigma_b^2}\right)^2\right]^{1/2} \quad ,$$

1. *This computational form is obtained from the determinant*

$$\begin{vmatrix} \sigma_x^2 - K & \sigma_x\sigma_y\rho \\ \sigma_x\sigma_y\rho & \sigma_y^2 - K \end{vmatrix} ,$$

where K is $\sigma^2_{(+,-)}$, and σ_a and σ_b are analogous to the standard deviation of the major and minor axes of the bivariate normal probability ellipse.

and

$$\tan \psi = \frac{\bar{Y}}{\bar{X}} \frac{\sigma_a^{\,2}}{\sigma_b^{\,2}} \quad .$$

Since this density function cannot be integrated in closed form from zero to R, numerical integration is used to obtain practical results for the probability distribution function; i.e.,

$$F(R) = \int_0^{R*} f(R)\, dR \quad . \tag{30}$$

A number of special cases can be obtained from the general Rayleigh distribution [equation (29)], the simplest of which is to let $\sigma_x \equiv \sigma_y = \sigma$ and $\bar{X} = \bar{Y} = 0$ with independent variables X and Y. This gives

$$f(R) = \frac{R}{\sigma^2} e^{-R^2/2\sigma^2} \quad , \tag{31}$$

which is recognized as the classical Rayleigh probability density function. The density function, equation (31), can be integrated in closed form over any range of the variable R. Hence, the probability distribution function, F(R), for equation (31) is

$$F(R) = 1 - \exp\left\{\frac{-R^2}{2\sigma^2}\right\} \quad . \tag{32}$$

C.3.3. The Derived Distribution of Wind Direction

Considering the wind as a vector quantity and bivariate normally distributed, the wind direction can be derived. This is done by first writing the bivariate normal probability density function in polar coordinates whose variables are

$$g(r,\theta) = rd_1 e^{-\frac{1}{2}(a^2r^2 - 2br + c^2)} \quad , \tag{33}$$

(see footnote 2)

where

$$a^2 = \frac{1}{(1-\rho^2)}\left[\frac{\sin^2\theta}{\sigma_x^2} - \frac{2\rho\cos\theta\sin\theta}{\sigma_x\sigma_y} + \frac{\cos^2\theta}{\sigma_y^2}\right] \quad ,$$

$$b = \frac{-1}{(1-\rho^2)}\left[\frac{\bar{x}\sin\theta}{\sigma_x^2} - \frac{\rho(\bar{x}\cos\theta + \bar{y}\sin\theta)}{\sigma_x\sigma_y} + \frac{\bar{y}\cos\theta}{\sigma_y^2}\right] \quad ,$$

$$c^2 = \frac{1}{(1-\rho^2)}\left[\frac{\bar{x}^2}{\sigma_x^2} - \frac{2\rho\bar{x}\bar{y}}{\sigma_x\sigma_y} + \frac{\bar{y}^2}{\sigma_y^2}\right] \quad ,$$

$$d_1 = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho^2}} \quad ,$$

$r = \sqrt{x^2 + y^2}$ is the modulus of the vector or speed, and θ is the direction of the vector. After integrating $g(r,\theta)$ over $r = 0$ to ∞, the probability density function of θ is

$$g(\theta) = \frac{d_1}{a^2}\, e^{-\frac{1}{2}c^2}\left[1 + \sqrt{2\pi}\left(\frac{b}{a}\right) e^{\frac{1}{2}\left(\frac{b}{a}\right)^2} \Phi\left(\frac{b}{a}\right)\right] \quad , \tag{34}$$

2. *This expression, equation (33), in Smith (1976) is given with respect to the mathematical convention for a vector direction.*

where a^2, b, c^2, and d_1 are as previously defined in equation (33) and

$$\Phi\left(\frac{b}{a}\right) = \Phi\ (x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-\frac{1}{2}t^2}\ dt$$

is taken from tables of normal distribution functions or made available through a computer subroutine.

If desired, equation (34) can be integrated numerically over a chosen range of θ to obtain the probability that the vector direction will lie within the chosen range; i.e.,

$$F(\theta) = \int_{\theta_2}^{\theta_1} g(\theta)\ d\theta \quad . \tag{35}$$

One application may be to obtain the probability that the wind will flow from a given quadrant or sector as, for example, onshore.

C.3.4. The Derived Conditional Distribution of Windspeed Given the Wind Direction (Wind Rose)

Continuing with the considerations in section C.3.3. of this chapter, the conditional probability density function (pdf) for windspeed, r, given a specified value for the wind direction, θ, can be expressed as

$$f(r\,|\,\theta) = \frac{a^2\ r\ e^{-\frac{1}{2}(a^2 r^2 - br)}}{1 + \sqrt{2\pi}\left(\frac{b}{a}\right) e^{\frac{1}{2}\left(\frac{b}{a}\right)^2} \Phi\left\{\frac{b}{a}\right\}} \quad , \tag{36}$$

where the coefficients, $\underline{a}$ and $\underline{b}$ and the function $\Phi\left\{\frac{b}{a}\right\}$ are as previously defined in equation (33) and in equation (34).

From equation (36) the mode (most frequent value) of the conditional windspeed given a specified value of the wind direction is the positive solution of the quadratic equation,

$$a^2\ r^2 - br - 1 = 0 \quad , \tag{37}$$

which is

$$(\tilde{r} \mid \theta) = \frac{1}{2a} \left[\left(\frac{b}{a}\right) + \sqrt{4 + \left(\frac{b}{a}\right)^2} \right] \quad . \tag{38}$$

The locus of the conditional modal values of windspeed when plotted in polar form versus the given wind directions forms an ellipse.

The noncentral moment for equation (36) is expressed as

$$\mu_n' = \int_0^\infty r^n \, f(r \mid \theta) \, dr \quad . \tag{39}$$

Now the first noncentral moment is identical to the first central moment or the expected value, $E\,(r \mid \theta)$. The integration of equation (39) for the first moment is sufficiently simple to yield practical computations and can be expressed as

$$E(r \mid \theta) = \frac{\left(\frac{b}{a}\right) + \left[1 + \left(\frac{b}{a}\right)^2\right] \sqrt{2\pi}\, e^{\frac{1}{2}\left(\frac{b}{a}\right)^2} \Phi \left\{\frac{b}{a}\right\}}{a \left[1 + \left(\frac{b}{a}\right) \sqrt{2\pi}\, e^{\frac{1}{2}\left(\frac{b}{a}\right)^2} \Phi \left\{\frac{b}{a}\right\}\right]} \quad . \tag{40}$$

Hence, equation (40) gives the conditional mean value of the windspeed given a specified value for the wind direction.

The integration of equation (36) for the limits $r = 0$ to $r = r^*$ gives the probability that the conditional windspeed is $\leq r^*$ given a value for the wind direction, θ. This conditional probability distribution (PDF) can be written as

$$\Pr\left\{ r \leq r^* \mid \theta = \theta_o \right\} = 1 - \left[\frac{e^{-\frac{1}{2} r_s^2} + \sqrt{2\pi}\left(\frac{b}{a}\right)\left\{1 - \Phi\,(r_s)\right\}}{e^{-\frac{1}{2}\left(\frac{b}{a}\right)^2} + \sqrt{2\pi}\left(\frac{b}{a}\right) \Phi \left\{\frac{b}{a}\right\}} \right] \cdot \tag{41}$$

where

$$r_s = \left[a\, r^* - \left(\frac{b}{a}\right) \right] \quad .$$

By definition, equation (41) is an expression for a "wind rose." Empirical wind rose statistics are often tabulated or graphically illustrated giving the frequency that the windspeed is not exceeded for those windspeed values that lie within assigned class intervals of the wind direction. After evaluation of equation (41) for various values of windspeed, r^*, and the given wind directions, θ, interpolations can be performed to obtain various percentile values of the conditional windspeed.

For the special case when b in equation (33) equals zero (i.e., for $\bar{x} \equiv \bar{y} = 0$), the conditional modal values of windspeeds [equation (38)], the conditional means of windspeeds [equation (40)], and the fixed conditional percentile values of windspeeds [interpolated from evaluations of equation (41)] when plotted in polar form versus the given wind directions, produce a family of ellipses.

For the special case when $\bar{x} = \bar{y} = 0$, equation (36) reduces to the following simple case:

$$\Pr\left\{ r \le r^* \mid \theta = \theta_0 \right\} = 1 - e^{-\frac{a^2 r^{*2}}{2}} \quad . \tag{42}$$

There is a special significance of equation (42) when related to the bivariate normal probability distribution. If r^* and θ are measured from the centroid of the probability ellipse, then the probability that $r \le r^*$ is the same as the given probability ellipse. Further, solving equation (42) for r^*, gives

$$r^* = \frac{1}{a} \sqrt{-2 \ln (1 - P)} \quad . \tag{43}$$

If a probability ellipse P is chosen, equation (42) gives the distance of r along any θ from the centroid of the ellipse to the intercept of the specified probability ellipse. If there is an interest in conditional probability of winds for a given θ relative to the monthly means, equation (43) is applicable. If it is desired to find the magnitude of the wind along any θ relative to the monthly mean to the intercept of a given probability ellipse, equation (43) is applicable.

D. Statistical Parameters With Respect To Any Orthogonal Axes

The five wind statistical parameters presented in table I are given with respect to the standard meteorological coordinate system; i.e., these parameters are for the U and V components. For many aerospace vehicles and range applications, there is a need for wind statistics with respect to orthogonal axes other than west to east and south to north. For example, it may be required to present wind statistics with respect to a flight azimuth of an

aerospace vehicle whose flight azimuth is α degrees from true north measured in a clockwise direction. The following sets of equations are presented to compute the five parameters for the new coordinate axes rotated α degrees clockwise from true north.

a. Rotation of the means through α degrees:

$$\bar{X}_\alpha = \bar{X} \cos (90 - \alpha) + \bar{Y} \sin (90 - \alpha) \tag{44}$$

$$\bar{Y}_\alpha = \bar{Y} \cos (90 - \alpha) - \bar{X} \sin (90 - \alpha) \quad . \tag{45}$$

b. Rotation of the variances through α degrees:

$$\sigma_{x_\alpha}^{2} = \sigma_x^{2} \cos^2 (90 - \alpha) + \sigma_y^{2} \sin^2 (90 - \alpha)$$

$$+ 2\rho\sigma_x\sigma_y \cos (90 - \alpha) \sin (90 - \alpha) \tag{46}$$

$$\sigma_{y_\alpha}^{2} = \sigma_y^{2} \cos^2 (90 - \alpha) + \sigma_x^{2} \sin^2 (90 - \alpha)$$

$$- 2\rho\sigma_x\sigma_y \cos (90 - \alpha) \sin (90 - \alpha) \quad . \tag{47}$$

c. Rotation of the linear correlation coefficient through α degrees:

$$\rho_\alpha = \frac{\mathrm{cov}\ (X,Y)_\alpha}{\sigma_{x_\alpha} \sigma_{y_\alpha}} \quad , \tag{48}$$

where $\mathrm{cov}\ (X,Y)_\alpha$ is the rotated covariance,

$$\mathrm{cov}\ (X,Y)_\alpha = \mathrm{cov}\ (X,Y)\ [\cos^2 (90 - \alpha) - \sin^2 (90 - \alpha)]$$

$$+ \cos (90 - \alpha) \sin (90 - \alpha) (\sigma_y^{2} - \sigma_x^{2})$$

and

$$\mathrm{cov}\,(X,Y) = \rho\sigma_x\sigma_y \quad .$$

By using these rotational equations, the bivariate normal distribution with respect to any desired rotated coordinates can be obtained from sample estimates that have been computed with respect to a specific axis. The marginal distributions after rotation are also normally (univariate) distributed. Using the rotational equations greatly reduces computational efforts for applications requiring statistics with respect to several coordinate axes.

Appendix A presents some illustrative examples for the wind statistics of the specific RRA.

CHAPTER III. STATISTICS OF THERMODYNAMICS QUANTITIES AND MODELS

A. General Considerations

A.1. Objectives

The objective inherent in developing the thermodynamic section of the RRA was to describe the thermodynamic characteristics of the atmosphere using a minimum of data tabulations. A set of parameters was selected which, together, thermodynamically describe the climatological state of the atmosphere. These parameters are the pressure, temperature, density, dewpoint, virtual temperature, and water vapor pressure. Used together, these parameters permit the calculation of a large number of derived quantities. (Symbols used in the calculations in this chapter are summarized in table D.) Some of these quantities, such as the speed of sound, are dealt with in section III.E.

The probability distribution of each of the six thermodynamic RRA parameters is described by its mean value, its standard deviation, and its skewness. Several of these parameters (temperature, pressure, dewpoint and density) have probability distributions that are close to a univariate normal distribution; the others do not. The skewness parameter gives an estimate of the asymmetrical departures of a probability distribution.

Hydrostatically modeled mean values of pressure and density were calculated (table IV), so that users may determine the departure of the actual climatological values of these parameters from hydrostatic conditions. This was done by hydrostatically integrating the pressure from the lowest RRA data level to the termination altitude of the particular RRA.

A.2. Data Quality Control

Data limits derived from the following parameters were used to screen the thermodynamic portion of the RRA data base: temperature, pressure, dewpoint (for the 0- to 30-km portion only), and density (for the 30- to 70-km portion only). These limits were set to plus and minus six standard deviations from the mean values of each of these quantities. These limits were used to screen the thermodynamic portion of the RRA data base, according to the procedures described in section I.C. The data base used to generate the thermodynamic portion of the RRA (tables I, II, and IV) was considered to be free from errors under the following conditions:

a) The skewness values of the pressure and temperature were between -2.5 and 2.5 at all data levels.

b) The skewness values of the density were between -3.5 and 3.5 at data levels between 0 and 30 km.

c) The skewness values of the density were between -3.0 and 3.0 at data levels between 30 and 70 km.

d) The skewness values of the dewpoint were between -2.5 and 2.5 at all data levels with more than 10 data values.

TABLE D. LIST OF SYMBOLS USED IN CHAPTER III

C_s	- Speed of sound
C_d	- Collision diameter
E	- Vapor pressure
g_ϕ	- Gravity at latitude ϕ
H	- Geopotential height
H_m	- Geopotential height at a mandatory radiosonde data level
H_s	- Geopotential height at a significant radiosonde data level
K_t	- Coefficient of thermal conductivity
L	- Mean free path length
M	- Mean molecular weight of air at sea level
M3Q	- Annual or monthly third moment of quantity Q
n	- Refractive modulus
N	- Refractive index
NA	- Avogadro's constant
N_Q	- Number of values of quantity Q
P	- Pressure
P_m	- Pressure at a mandatory radiosonde data level
P_s	- Pressure at a significant radiosonde data level
P_h	- Hydrostatically integrated mean monthly or annual pressure
Q	- Any tabulated RRA quantity
R*	- Universal gas constant
R'	- Specific gas constant of dry air
r', r*	- Parameters used in converting z to h and vice versa

TABLE D. (concluded)

S	-	Sutherland's constant, used in the calculation of dynamic viscosity
T	-	Temperature
T_d	-	Dew point
T_v	-	Virtual temperature
T_{vm}	-	Virtual temperature at a mandatory radiosonde data level
T_{vs}	-	Virtual temperature at a significant radiosonde data level
V	-	Mean air particle speed
V_c	-	Mean collision frequency
w	-	Parameter used in the hydrostatic interpolation of pressure and density
Z	-	Geometric altitude
λ	-	Wavelength
α_Q	-	Skewness of quantity Q
β	-	Constant used in the equation for viscosity
γ	-	Ratio of specific heat at constant pressure to specific heat at constant volume
η	-	Kinematic coefficient of viscosity
μ	-	Dynamic coefficient of viscosity
ρ	-	Density
ρh	-	Mean monthly or annual density derived from pressure height
σ	-	Standard deviation of the quantity Q

A.3 Limitation of Thermodynamic Statistics

The correlation coefficients between the thermodynamic quantities and the moisture-related quantities were not calculated at discrete altitudes, nor were any of the correlations between altitudes. Therefore, valid statistical dispersion models that require the relationship between two or more of these quantities at the same altitude or between altitudes cannot be derived. Approximations for the correlation coefficients between pressure, virtual temperature, and density at discrete altitudes may be obtained from the coefficients of variation as developed by Buell (1970). The coefficient of variation is the standard deviation divided by the mean. The mean values and the standard deviations are taken from table II. A model for the profile of monthly and annual mean pressure, virtual temperature, and density that is in excellent agreement with the respective statistical mean values is given by table IV. This agreement results because the physical relationships, given by the hydrostatic equation and the equation of state, were used to derive table IV. When only the monthly or annual mean values for pressure, virtual temperature, and density are required, it is recommended that table IV be used.

B. Establishing Data Samples at the Required Altitude Levels

This section describes the computational procedures used to establish data samples of the thermodynamic RRA parameters at the RRA data levels. References are cited only when an equation given is one of many available in the literature or when an equation is stated in an unusual form.

B.1. Conversion of Data Recorded in Geopotential Heights to Geometric Altitude

The upper-air rocketsonde observations used to obtain the table values above 30 km were recorded in terms of geometric altitude and can be interpolated directly to the altitude intervals shown in the tables. However, the radiosonde observations used to obtain the tabular values below 30 km were recorded in terms of geopotential heights. The change of coordinates from geopotential heights to geometric altitudes (h to z) is accomplished by calculating a table of geopotential heights that correspond exactly to the geometric altitudes at which the atmospheric parameters are tabulated. The radiosonde observations are then interpolated to these geopotential heights. The relationship used to calculate geometric altitude from geopotential height is

$$H = (r'z)/(r^*z) \quad , \qquad (49)$$

where

$$r' = gr^*/9.80665$$

and

$$r^* = -2g_\phi/(\partial g_\phi/\partial z_0) \quad .$$

g_ϕ is the sea-level gravity at the latitude ϕ corresponding to the proper location. This value is given by (List, 1968)

$$g_\phi = 9.780356\ (1 + 5.2885 \times 10^{-3} \sin^2\phi - 5.9 \times 10^{-6} \sin^2 (2\phi)). \quad (50)$$

$\frac{\partial g_\phi}{\partial z_o}$ is the rate of change of gravity at the sea level. This quantity is given by the equation

$$\frac{\partial g_\phi}{\partial z_o} = -3.085462 \times 10^{-6} + 2.27 \times 10^{-9} \cos (2\phi) - 2 \times 10^{-12} \cos (4\phi). \quad (51)$$

The units used for gravity are meters per square second, while the units for $\frac{\partial g_\phi}{\partial z_o}$ are per square second.

The resulting table of values of H obtained by using even increments of 2 in equation (49) is shown in table IV of the RRA. The values of H above 30 km are not used in the interpolation of original data, but are included for the convenience of the user.

B.2. Calculations on the Original Rawinsonde Data Records

It was necessary to interpolate the information from the original rawinsonde data records to the geometric altitudes specified as the RRA data levels The parameters for which this interpolation was required were the temperature, dewpoint, and pressure. The other parameters were calculated from the interpolated values at each RRA data level. These "derived" parameters were the water vapor pressure, density, and virtual temperature.

B.2.1. Calculation of the Geopotential Height at Significant Levels

Two somewhat different interpolation procedures were used to obtain data from radiosonde and rocketsonde observations at the levels shown in the tables. The procedure used to interpolate radiosonde observations began with the calculation of virtual temperature at each data level in a sounding. The virtual temperature was computed by

$$T_v = T/(1. - 0.379\ (e/p)) \quad (52)$$

where T_v and T are in degrees Kelvin and e and p are in millibars.

The radiosonde soundings contain a mix of data taken at "mandatory" and "significant" levels. Pressure, temperature, and dewpoint information was given in these soundings at both types of levels. However, geopotential height information was only given at the mandatory levels. The heights at the significant levels were "filled in" (calculated) hydrostatically using pressure and temperature data from these levels. This procedure permitted the use of most of the significant level data in the calculation of the RRA tables. The equation used for this process was

$$H_s = H_m + 29.2712617 \; \frac{(T_{vs} - T_{vm})}{2} \; \ln(P_s/P_m) \quad , \tag{53}$$

where the subscripts s and m denote quantities at significant and mandatory levels. This equation was not used if the difference between two adjacent mandatory levels was greater than 200 mb. All soundings with such data gaps were rejected for use in compiling the RRA.

B.2.2. Temperature

Radiosonde temperatures were interpolated logarithmically with respect to pressure using the equation

$$T = T_U + (T_L - T_U) \; \frac{\ln p - \ln p_L}{\ln p_U - \ln p_L} \quad , \tag{54}$$

where the subscripts U and L indicate values at the nearest data levels in the actual sounding above and below the interpolated level.

B.2.3. Pressure

The pressure values in each radiosonde sounding were interpolated to the RRA data levels using the equation

$$p = p_L \; \exp\left(\frac{H_L - H_U}{29.2712617 \; (0.5) \; (T_{v_U} + T_{v_L})}\right) \tag{55}$$

where the subscript L indicates virtual temperature, geopotential height, and pressure values at the data level below and closest to the level at which data were required.

B.2.4. Dewpoint Temperature

Dewpoint values were interpolated logarithmically with respect to pressure using the equation

$$T_d = T_{dU} + (T_{dL} - T_{dU}) \left(\frac{\ln p - \ln p_L}{\ln p_U - \ln p_L}\right) \quad . \tag{56}$$

The subscripts U and L indicate data at the nearest upper and lower data levels in a sounding.

B.2.5. Derived Water Vapor Pressure

The water vapor pressure was calculated from the interpolated dewpoint values at the RRA data levels using Teten's approximation:

$$e = 6.11 \text{ mb} \times 10^{7.5(T_d - 273.15)/(T_d - 35.86)} \quad . \tag{57}$$

B.2.6. Derived Density

The density values derived from radiosonde observations were calculated at the RRA data levels using the equation

$$\rho = 348.36787\ p/T_v \quad . \tag{58}$$

B.2.7. Derived Virtual Temperature

The virtual temperature values were calculated at the RRA data levels for each sounding using the equation

$$T_v = T/(1 - 0.379(e/p)) \quad , \tag{59}$$

where T_v and T are in degrees Kelvin, and p and e are the pressure and vapor pressure, respectively, in millibars.

B.3. Calculations on the Original Rocketsonde Data Records

The rocketsonde data records used to calculate the RRA table values above 30 km were given in terms of geometric altitude. For this reason, slightly different calculations were required to convert the recorded data values to values at the RRA data levels. The pressure, temperature, and density were all interpolated to the RRA data levels; moisture-related parameters (virtual temperature, water vapor pressure, and dewpoint) were not calculated, since atmospheric moisture at altitudes above 30 km was considered to be negligible.

No interpolation was done across gaps in the pressure or temperature data within a sounding larger than 7,000 m. Data values at the RRA levels within such a gap were set to missing.

B.3.1. Temperature

Rocketsonde temperatures were interpolated linearly with respect to geometric altitude using the equation

$$T = T_U + (T_L - T_U)\,\frac{Z - Z_L}{Z_U - Z_L}\ , \qquad (60)$$

where the subscripts U and L indicate values at the nearest data level in the actual sounding above and below the interpolated level.

B.3.2. Pressure

The pressure values in each rocketsonde sounding were interpolated to the RRA data levels using the equation

$$P = P_L \exp\left(-\frac{g_\phi}{R^*}\ \frac{M(Z - Z_L)}{\overline{T}v} \cdot W^2\right)\ , \qquad (61)$$

where $\overline{T}_v = \dfrac{T_{vU} + T_{vL}}{2}$ and $W = \dfrac{r^*}{\left(r^* + Z + \dfrac{Z - Z_L}{2}\right)}$.

B.3.3. Density

Rocketsonde density values were interpolated using the equation

$$\rho = \rho_L \exp\left(-\frac{g_\phi M}{R^*}\ \frac{(Z - Z_L)}{\overline{T}_v} \cdot W^2\right)\ , \qquad (62)$$

where W is specified in section III.B.3.2.

C. Computation of Statistical Parameters for Tables II and III

A three-step procedure was used for computing the monthly and annual means, standard deviations, and skewness values from the data values at the RRA data levels. Initially, certain statistical sums were calculated and stored as the soundings in the data base were processed. These sums were then used to calculate the monthly statistics given in the RRA tables. The annual statistics were then calculated from these stored sums and the monthly statistics.

C.1. Stored Statistical Sums

The sums calculated were

$$\sum Q,\ \sum Q^2,\ \text{and}\ \sum Q^3 \quad .$$

where Q is any one of the quantities given in the thermodynamic part of the RRA.

C.2. Calculation of the Monthly Statistics

C.2.1. Monthly Means

The mean monthly values of the thermodynamic RRA quantities were calculated using the equation

$$\bar{Q} = \sum Q / N_Q \quad ,$$

where N_Q is the number of observed values of the quantity Q for a given month.

C.2.2. Monthly Standard Deviations

The monthly standard deviations of the thermodynamic RRA quantities were calculated using the equation

$$\sigma_Q = \sqrt{\frac{(N_Q \Sigma' Q^2) - (\Sigma Q)^2}{N_Q \cdot (N_Q - 1)}} \quad . \tag{63}$$

C.2.3. Monthly Skewness Values

The monthly skewness values of the windspeed and of the thermodynamic RRA quantities were calculated using the equation

$$\alpha_Q = \frac{M3_Q}{\sigma_Q^3} \quad ,$$

where $M3_Q$ is the third moment of the quantity Q, σ_Q is its standard deviation, and

$$M_{3Q} = \left[\frac{\Sigma_Q^3}{N_Q} - \frac{3\Sigma_Q \Sigma_Q^2}{N_Q^2} - \frac{2\Sigma_Q^3}{N_Q^3} \right] \cdot \frac{N_Q^2}{(N_Q - 1)(N_Q - 2)} \quad . \tag{64}$$

C.3. Calculation of the Annual Statistics

Equations (63) and (64), used to calculate the monthly values of the standard deviations and skewness values, involve taking the differences between two pairs of large sums containing Q^2 and Q^3, where Q is the thermodynamic RRA quantity. Using these equations to compute the annual statistics would have resulted in a substantial loss of precision, as these sums become larger by several orders of magnitude in such a case. This problem was avoided by calculating the annual means, standard deviations, and skewness values from the monthly statistics.

C.3.1 Annual Mean Values

The annual mean values of the thermodynamic RRA quantities were calculated using the equation

$$Q_{ANN} = Q_A / N_Q \quad ,$$

where Q_A is the total of all observed values of Q and N_Q is the total number of observations of Q.

C.3.2. Annual Standard Deviations

The annual standard deviations of the thermodynamic RRA quantities were calculated using the equation

$$\sigma Q_{ANN} = \sqrt{\frac{1}{N_Q} \sum_{i=1}^{12} (N_{Qi} \, \sigma_{Qi}{}^2) + \frac{1}{N_Q} \sum_{i=1}^{12} (N_{Qi} \, \bar{Q}_i{}^2) - Q_{ANN}{}^2} \quad , \qquad (65)$$

where N_{Qi} = the number of data values for Q in month i (i = 1 to 12), Q_i = the monthly mean of Q, and σ_{Qi} = the standard deviation of quantity Q in month i.

C.3.3. Annual Skewness Values

The annual skewness values of the thermodynamic RRA quantities were calculated using the equation

$$M3Q_{ANN} = \frac{1}{\bar{N}} \sum_{i=1}^{12} (N_{Qi}\, M_{3Qi}) + \frac{3}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, \bar{Q}_i\, \sigma_{Qi}^{\;2})$$

$$+ \frac{1}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, Q_i^{\;3}) - \frac{3\bar{Q}_{ANN}}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, Q_i^{\;2})$$

$$- \frac{3\bar{Q}_{ANN}}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, \sigma_{Qi}^{\;2}) + 2\bar{Q}_{ANN}^{\;\;3} \quad , \tag{66}$$

where M_{3Qi} = the third moment about the mean of quantity Q in month i and $M3Q_{ANN}$ = the annual third moment about the mean of the quantity Q.

D. Derived Monthly Mean and Annual Mean Model Atmospheres

A set of modeled monthly mean and annual mean hydrostatic values of pressure and density was calculated from the lowest RRA data level (0 km, mean sea level) upwards to 30 km, and from 30 km upwards to 70 km. The integration from 0 to 30 km was computed independently of the integration from 30 to 70 km because of the difference in data sources. The two different values for 30 km are provided for comparison. When 30-km data are required, the values given in the 0- to 30-km table should be used. These hydrostatically modeled mean values, which are given in table IV, are useful as a check on the validity of the pressure and density values given in table II. In most cases, the values in tables II and IV for any given data level are within 1 percent of each other. The hydrostatic pressure values in table IV were calculated using the equation

$$p_1 = p_0 \exp\left(- \frac{0.034162\ (H_1 - H_0)}{0.5\ (T_{v_1} + T_{v_0})} \right) \quad , \tag{67}$$

where $H_1 - H_0$ is in meters and a "0" subscript refers to values at the RRA data level immediately below the level being checked. p_0 at the lowest data level is set equal to the RRA mean pressure; p_1, calculated for the next highest data level, is taken as p_0 for the level above that. This process is repeated for all the other RRA data levels. The hydrostatic density corresponding to the hydrostatic pressures is calculated from these pressures and the RRA virtual temperature values using the formula

$$\rho_H = 348.36786\ P_H/T_v \quad , \tag{68}$$

where ρ_H and P_H are the hydrostatic density and pressure shown in table IV of the RRA.

E. Thermodynamic Quantities Derivable from the Basic Tables

Several other quantities can be calculated from the statistics listed in tables I and II. Primary physical constants used in these calculations are listed in table E. The equations given in this section can be used to calculate the approximate mean values of these quantities at each RRA data level. It is not possible to infer or derive any information concerning the standard deviation or skewness values of these quantities from the data in tables II and III of the RRA.

E.1. Mean Air Particle Speed

The mean air particle speed, V, is the arithmetic average of the speeds of all air particles in the volume element being considered. For a valid average to occur, there must be a sufficient number of particles involved to represent mean conditions. The equation for V for dry air is

$$V = \sqrt{\frac{8}{\pi} \cdot \frac{R^*T}{M}} \quad . \tag{69}$$

A computational form for dry air, using tabulated values, is

$$V = \sqrt{7.3094 \times 10^2 \times T} \text{ (meters per second)} \quad , \tag{70}$$

where T is the temperature in degrees Kelvin from table II. Equation (69), when corrected for moist air, becomes

$$V = \sqrt{\frac{8}{\pi} \cdot R' \, T_V} \quad . \tag{71}$$

The computational form for moist air is

$$V = \sqrt{7.3094 \cdot 10^2 \cdot T_V} \text{ (meters per second)} \quad , \tag{72}$$

where T_V is the virtual temperature in degrees Kelvin from table III.

TABLE E. LIST OF PRIMARY PHYSICAL CONSTANTS

P_o = standard atmospheric pressure at sea level
= 1.013250×10^5 Newton/m^2 = 2116.22 lb/ft^2

ρ_o = standard atmospheric density at sea level
= 1.2250 kg/m^3 = 0.076474 lb/ft^3

T_o = standard temperature at sea level = 288.15 K = 15.0°C = 59.0°F

g_o = standard gravity at sea level at latitude 45°32'33"
= 9.80665 m/s^2

s = Sutherland's constant used in calculation of dynamic viscosity
= 110.4 K

T_I = ice-point temperature at P_o = 273.15 K

β = constant used in calculation of dynamic viscosity
= 1.458×10^{-6} kg/s m K$^{\frac{1}{2}}$
= 7.3025×10^{-7} lb/s ft R$^{\frac{1}{2}}$

γ = ratio of specific heat of air at constant pressure to specific heat of air at constant volume
= 1.4

C_D = mean effective collision diameter of air molecules
= 3.65×10^{-10} m = 1.1975×10^{-9} ft

N_a = Avogadro's constant
= 6.022169×10^{26}/kg mol = 2.73179×10^{26}/lb mol

R* = gas constant = 8.31432 J/mol K

R' = gas constant for dry air = 2.8704×10^2 J/kg K

M = molecular weight of dry air = 28.966 g/mol

E.2 Mean Free Path

The mean free path, L, is the mean value of the distance traveled by each neutral air particle in a selected air parcel, between successive collisions with other particles in that parcel. A meaningful average requires that the selected parcel be large enough to contain a substantial number of particles. The equation for L is given by

$$L = \left(\frac{\sqrt{2}}{2\pi}\right)\left(\frac{R^*T}{N_a\ C_d^{\ 2}\ P}\right) \quad , \tag{73}$$

where C_d is the effective collision diameter of the mean air molecules. The 1976 standard atmosphere value of 3.65×10^{-10} is valid for the range of altitudes in the RRA.

A computational form for moist air, using tabulated values, is

$$L = 2.335 \times 10^{-7}\ \frac{T}{P}\ \text{(meters)} \quad , \tag{74}$$

where T is the temperature in degrees Kelvin from table II and P is the pressure in millibars from table II.

A form of (73) to correct L for moist air is

$$L = \left(\frac{\sqrt{2}}{2\pi}\right)\frac{R'MT_v}{N_a\ C_d^{\ 2}} \quad . \tag{75}$$

The computational form for moist air is

$$L = 2.3325 \times 10^{-7}\ \frac{T_v}{P}\ \text{(meters)} \quad , \tag{76}$$

where T_v is the virtual temperature in degrees Kelvin from table III and P is the pressure in millibars from table II.

E.3. Mean Collision Frequency

The mean collision frequency, V_c, is considered to be the average speed of air particles contained in an air parcel, divided by the mean free path of the particles inside that parcel. Computationally this is equivalent to

$$V_c = \frac{V}{L} \ (\text{sec}^{-1}) \quad . \tag{77}$$

To determine V_c for dry air, use V and L from equations (70) and (74). To determine V_c for moist air, use V and L from equations (72) and (76).

E.4. Speed of Sound

The expression for the speed of sound, C_s, in meters per second in dry air, is

$$C_s = \sqrt{\frac{\gamma R^* T}{M}} \quad . \tag{78}$$

To compute C_s for dry air from tabulated values, use

$$C_s = \sqrt{4.0185 \times 10^2 \times T} \quad \text{(meters per second)} \quad , \tag{79}$$

where T is the temperature in degrees Kelvin from table II. One form for the speed of sound in moist air is

$$C_s \approx \sqrt{\gamma R' T_v} \quad , \tag{80}$$

where T_v is the virtual temperature from table III. A computational form for moist air is

$$C_s \approx \sqrt{4.0185 \times 10^2 \ T_v} \quad \text{(meters per second)} \quad . \tag{81}$$

E.5. Dynamic Coefficient of Viscosity

The coefficient of dynamic viscosity, μ, is defined as a coefficient of internal friction developed where gas regions move adjacent to each other at different velocities. The following expression is taken from the U.S. Standard Atmosphere (1976):

$$\mu = \frac{\beta \cdot T^{3/2}}{T + S} \quad . \tag{82}$$

The computational form is

$$\mu = \frac{(1.458 \times 10^{-6})\, T^{3/2}}{T + 110.4} \quad \text{(kilograms per second per meter)} \quad , \tag{83}$$

where T is the temperature in degrees Kelvin from table II.

E.6. Kinematic Coefficient of Viscosity

The kinematic coefficient of viscosity, designated as η, is defined to be the ratio of the dynamic coefficient of viscosity of a gas to its density, or

$$\eta = \mu / \rho \quad . \tag{84}$$

The computational form is

$$\eta = 1.0 \times 10^{3}\ \mu / \rho \quad \text{(square meters per second)} \quad , \tag{85}$$

where μ is the dynamic coefficient of viscosity from equation (83) and ρ is the density in grams per cubic meter from table II.

E.7. Coefficient of Thermal Conductivity

The empirical expression used for the coefficient of thermal conductivity, designated as K_t, is given in the 1976 Standard Atmosphere as

$$K_t = \frac{2.65019 \times 10^{-3} \cdot T^{3/2}}{T + 245.4 \times 10^{-(12/T)}} \quad \text{(watts per meter per degree Kelvin)} \quad , \tag{86}$$

where T is in degrees Kelvin.

E.8. Refractive Modulus and Refractive Index

The refractive modulus or refractivity (Selby and McClatchey, 1975; Smith and Weintraub, 1953) is defined as N, where

$$N = (n - 1) \cdot 10^{6} \tag{87}$$

and n is the refractive index.

For microwave frequencies below approximately 30 GHz (equivalent to wavelengths above 1 cm), N, the refractive modulus, is given by the empirical equation

$$N = 77.6 \frac{P}{T_d} + 3.73 \times 10^5 \frac{e}{T^2} \text{ (dimensionless)}, \qquad (38)$$

where E and P are in millibars and T and T_d are in degrees Kelvin.

The following expression is valid for the visible and infrared wavelengths shorter than approximately 30 μm (0.03 mm).

$$N = 77.6 \frac{P}{T} + 0.584 \frac{P}{T\lambda} \text{ (dimensionless)}, \qquad (39)$$

where λ is the wavelength in microns and T is in degrees Kelvin.

The expression for N for the wavelength from 0.03 mm to 1 cm is an extremely complex function of wavelength.

CHAPTER IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This document satisfies the technical objectives established for the RRAC by the RCC MG. Upper air statistics and models for wind and thermodynamic quantities for the specific site have been derived in a consistent and uniform manner, which will be used in publications for all other assigned site locations. These RRAs represent an improvement over the previously published RRAs because of the availability of more extensive upper air data bases and the adaptation of more advanced statistical techniques. A statistical measure of central tendency (mean values) and a measure of dispersion (standard deviation with respect to the mean values) for monthly and annual reference periods have been tabulated for all variables in a consistent manner from data bases that have been edited and quality-controlled in the same manner. Further, a statistical measure for symmetry (skewness coefficient that involves the third statistical moment) has been tabulated for all variables except the U and V wind components. Even with these improvements, the user of these RRAs must recognize certain limitations of the statistical tabulations:

1) The wind profile structure with respect to altitude cannot be modeled from the RRA statistics because the interlevel and crosslevel correlations were not computed.

2) The profile structure with respect to altitude for any of the thermodynamic variables or any quantities derivable from these variables cannot be modeled because the prerequisite correlations were not computed. However, the profiles of monthly and annual means for pressure, virtual temperature, and density are in agreement (table IV) with the hydrostatic equation and the equation of state.

The preceding limitations are cited to prevent a misuse of the RRAs. More extensive statistical tabulations were beyond the scope of this committee's task. As greater insight is gained through usage of these RRAs, many adaptations of the statistical tabulations for specific engineering and scientific applications are envisioned.

Recommendations

It is recommended than the wind and thermodynamic statistical tabulations and attendant models contained in the RRAs be used as a standard reference source, as may be appropriate, by the ranges and range users. It is further recommended that the respective Range Staff Meteorologist or responsible agency staff member be consulted for the applicability of the RRAs for specific engineering applications.

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In addition to the documents above and the present RRA for White Sands Missile Range, New Mexico, the revised series will include RRAs for the following locations:

Edwards AFB, California
Point Mugu, California
Eglin AFB, Florida
Taquac (Guam)
Barking Sands, Hawaii
Ascension Island, South Atlantic

CONVERSION UNITS

Physical Constants and Conversion Factors

Numerical values in this document are given in the International System of Units (SI, Système International d'Unités). The values in parentheses are equivalent U.S. Customary Units, which are English units adapted for use by the United States of America. The SI and U.S. Customary Units provided in table F are those normally used for measuring and reporting atmospheric data.

By definition, the following fundamental conversion factors are exact:

Type	U.S. Customary Units	Metric
Length	1 U.S. yard (yd)	0.9144 meter (m)
Mass	1 avoirdupois pound (lb)	453.59237 gram (g)
Time	1 second (s)	1 second (s)
Temperature	1 degree Rankine (°R)	9/5 degree Kelvin (K)

To aid in the conversion of units, conversion factors based on the above fundamental conversion factors are given in table F.

TABLE F. FACTORS FOR CONVERSION UNITS

Type of Data	METRIC Unit	METRIC Abbreviation	U. S. CUSTOMARY Unit	U. S. CUSTOMARY Abbreviation	CONVERSION Multiply	CONVERSION By	CONVERSION To Get
TEMPERATURE							
Ambient Temperature	degree Celsius	°C	degree Fahrenheit	°F	°F - 32	0.5556	°C
	degree Kelvin	K	degree Rankine	°R	°C	1.8*	°F - 32
					°R	1.00*	°F + 459.67
					°R - 459.67	1.00*	°F
					K	1.00*	°C + 273.15
					K - 273.15	1.00*	°C
Temperature Change	degree Celsius	°C	degree Fahrenheit	°F	°C or K	1.8*	temp. change °F or °R
	degree Kelvin	K	degree Rankine	°R	°F or °R	0.5556	temp. change °C or K
DENSITY							
Water Vapor Vapor Concentration (Absolute Humidity) and Ambient Density	gram per cubic meter	$g\ m^{-3}$	grain per cubic foot	$gr\ ft^{-3}$	$g\ m^{-3}$	0.43700	$gr\ ft^{-3}$
	gram per cubic centimeter	$g\ cm^{-3}$			$gr\ ft^{-3}$	2.2883	$g\ m^{-3}$
					$g\ m^{-3}$	10^{-6}*	$g\ cm^{-3}$
					$g\ cm^{-3}$	4.370×10^{5}	$gr\ ft^{-3}$
					$gr\ ft^{-3}$	2.288×10^{-6}	$g\ cm^{-3}$
WIND							
Windspeed	meter per second	$m\ s^{-1}$	mile per hour	mph	$m\ s^{-1}$	2.2369	mph
			knots	knots	mph	0.44704*	$m\ s^{-1}$
			feet per second	$ft\ s^{-1}$	$m\ s^{-1}$	1.9438	knots
					knots	0.51444	$m\ s^{-1}$
					mph	0.868976	knots
					knots	1.15078	mph
					$m\ s^{-1}$	3.2808	$ft\ s^{-1}$
					$ft\ s^{-1}$	0.3048*	$m\ s^{-1}$
DISTANCE							
Length	meter	m	feet	ft	m	3.2808	ft
	micron	μ	inch	in.	ft	0.3048*	m
	Angstrom unit	Å			in.	$2.54 \times 10^{+4}$*	μ
					in.	$2.54 \times 10^{+8}$*	Å
					m	10^{+6}*	μ
					m	10^{+10}*	Å

* Defined exact conversion factor

TABLE F. (continued)

Type of Data	METRIC Unit	METRIC Abbreviation	U.S. CUSTOMARY Unit	U.S. CUSTOMARY Abbreviation	CONVERSION Multiply	CONVERSION By	CONVERSION To Get
DISTANCE (Concluded)					μ	10^{-6}*	m
					μ	3.937×10^{-5}	in.
					A	10^{-10}*	m
					A	3.937×10^{-9}	in.
MASS							
Weight	gram	g	grain	gr	lb	0.45359237*	kg
	kilogram	kg	pound	lb	lb	453.59237*	g
					kg	2.20462	lb
					g	15.4324	gr
					gr	0.06480	g
PRESSURE							
Atmospheric	newton per square meter	newton m^{-2}	pound force per square inch	lb $in.^{-2}$	mb	10^{-3}*	bar
					bar	10^{3}*	mb
	millimeter of Mercury	mmHg	inch of Mercury	in.Hg	newton m^{-2}	10^{-2}*	mb
					newton m^{-2}	1.4504×10^{-4}	lb $in.^{-2}$
					lb $in.^{-2}$	6.8948×10^{3}	newton m^{-2}
	bar	bar			mb	1.4504×10^{-2}	lb $in.^{-2}$
	millibar	mb			lb $in.^{-2}$	68.948	mb
	dyne per square centimeter (microbar)	dyne cm^{-2}			mb	10^{3}*	dyne cm^{-2}
					dyne cm^{-2}	10^{-3}*	mb
	kilogram force per square meter	kg m^{-2}			lb $in.^{-2}$	6.8948×10^{4}	dyne cm^{-2}
					dyne cm^{-2}	1.4504×10^{-5}	lb $in.^{-2}$
					mb	10.1972	kg m^{-2}
					kg m^{-2}	0.0980665	mb
					lb $in.^{-2}$	703.0696	kg m^{-2}
					kg m^{-2}	0.0014223	lb $in.^{-2}$
					mb	2.9530×10^{-2}	in.Hg (32°F)
					mb	0.75006	mmHg (0°C)
					in.Hg (32°F)	25.40*	mmHg (0°C)
					mmHg (0°C)	1.33322	mb
					in.Hg (32°F)	33.8639	mb
	pascal	Pa			Pa	1.00*	newton m^{-2}

* Defined exact conversion factor

TABLE I-1. WIND STATISTICAL PARAMETERS

JANUARY

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.02	2.29	-.0457	.08	2.77	2.73	2.33	1.28	346.
2.000	2.30	3.41	.3109	-.60	4.94	5.81	3.17	.97	345.
3.000	6.61	5.60	.1951	-1.61	5.75	9.66	4.15	.45	344.
4.000	10.13	7.54	.2764	-2.22	7.01	13.43	5.75	.35	342.
5.000	13.01	9.96	.2958	-2.33	8.56	16.94	7.73	.59	337.
6.000	15.16	11.80	.3858	-1.73	9.88	19.48	9.48	.65	326.
7.000	16.62	13.52	.4683	-1.24	11.44	21.70	10.95	.77	319.
8.000	18.09	14.79	.5126	-1.15	13.05	23.89	12.09	.74	313.
9.000	19.64	15.73	.5153	-.92	14.47	25.89	13.13	.60	305.
10.000	21.61	15.80	.4808	-.87	15.88	27.83	13.91	.50	294.
11.000	23.37	15.51	.4369	-1.02	15.50	29.07	13.49	.39	273.
12.000	25.25	15.28	.3802	-.61	14.47	30.20	12.95	.41	274.
13.000	25.54	13.44	.3053	-.74	13.06	29.42	11.75	.45	264.
14.000	24.67	11.27	.4086	-.92	11.77	27.81	10.07	.12	248.
15.000	22.62	10.52	.4217	-.97	10.40	25.25	9.47	.03	[illegible]
16.000	20.94	9.72	.4095	-.68	9.36	23.14	9.23	.09	222.
17.000	17.97	8.61	.3390	-1.29	7.53	19.77	8.01	.12	207.
18.000	14.39	7.86	.2858	-1.43	6.20	16.06	7.16	.26	199.
19.000	11.14	7.88	.2321	-1.28	5.52	12.93	7.02	.67	195.
20.000	9.09	7.86	.1715	-1.12	4.50	10.87	6.91	.96	185.
21.000	7.43	8.34	.1922	-1.03	3.97	9.74	6.82	1.16	174.
22.000	6.30	9.05	.1964	-1.04	4.16	9.65	6.81	1.25	162.
23.000	6.11	8.90	.3464	-.89	3.75	9.27	6.73	1.16	159.
24.000	5.85	9.27	.4295	-.80	3.92	9.44	6.84	1.24	147.
25.000	5.30	9.72	.3963	-.66	4.49	10.01	6.52	.99	134.
26.000	6.07	10.35	.3337	-.15	4.28	10.70	6.87	.68	131.
27.000	7.30	11.00	.4259	.15	4.61	11.83	7.39	.51	115.
28.000	8.20	11.79	.4518	.76	5.56	13.06	8.14	.47	112.
29.000	10.50	12.62	.3971	.95	4.28	14.06	9.47	.39	67.
30.000	7.66	15.14	.4384	1.36	7.13	15.55	9.90	1.05	214.
32.000	9.65	17.36	.3881	1.66	7.81	18.02	11.51	1.13	215.
34.000	12.03	18.93	.4928	1.01	8.49	19.67	13.71	1.38	214.
36.000	14.27	19.95	.4532	-.51	8.71	20.89	15.50	1.70	213.
38.000	16.24	20.76	.4323	-.96	9.72	22.82	16.37	1.44	215.
40.000	17.11	20.88	.3304	1.09	10.97	24.19	16.24	1.35	214.
42.000	20.05	22.22	.3571	4.54	11.92	27.78	16.89	1.08	213.
44.000	24.85	24.73	.3593	6.22	12.50	32.65	18.88	.80	213.
46.000	30.78	27.36	.2410	8.21	14.96	39.20	21.16	.52	211.
48.000	35.89	29.12	.2467	10.89	17.19	44.90	23.03	.24	210.
50.000	39.40	30.41	.2803	11.63	17.49	48.41	23.90	.12	208.
52.000	40.66	30.71	.3781	10.56	17.01	49.61	23.09	.04	209.
54.000	41.55	30.38	.3116	12.23	15.76	49.90	23.54	.07	208.
56.000	44.17	29.92	.3147	12.97	17.84	52.16	24.67	.09	201.
58.000	48.24	29.62	.3062	13.20	19.80	56.03	25.07	-.19	193.
60.000	55.78	30.32	.4131	12.98	20.05	62.04	27.37	-.11	181.
62.000	65.11	32.35	.2884	10.15	20.64	70.81	28.23	-.54	149.
64.000	73.91	32.63	.2322	5.52	21.67	78.35	29.72	-.50	124.
66.000	77.34	40.89	.0134	.63	19.78	83.87	31.63	-.31	98.
68.000	80.36	46.41	-.0083	-12.88	21.17	89.37	34.92	-.26	68.
70.000	82.99	41.40	.0574	-12.93	31.38	92.56	34.01	-.22	50.

TABLE I-2. WIND STATISTICAL PARAMETERS

FEBRUARY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.27	2.01	-.1241	-.09	2.90	2.75	2.22	.97	386.
2.000	2.15	3.38	.0387	-.39	5.15	5.71	3.15	.75	384.
3.000	5.81	5.22	.1173	-1.34	6.45	9.26	4.29	.32	383.
4.000	9.51	6.57	.1683	-1.80	7.41	12.60	5.74	.27	380.
5.000	12.61	8.71	.1956	-1.66	9.00	16.08	7.75	.42	369.
6.000	15.37	10.49	.2817	-1.57	10.22	19.07	9.45	.47	366.
7.000	18.08	12.10	.3781	-1.54	11.91	22.34	10.88	.34	358.
8.000	20.15	13.32	.3996	-1.55	13.42	24.92	12.02	.33	354.
9.000	22.31	14.56	.3460	-1.66	14.49	27.33	13.23	.35	345.
10.000	24.35	14.31	.2927	-1.91	15.48	29.39	13.27	.20	336.
11.000	27.09	13.72	.2690	-1.55	15.44	31.59	12.82	.14	324.
12.000	30.04	13.66	.2742	-1.64	15.44	34.01	13.13	.21	307.
13.000	30.38	12.04	.2353	-1.15	13.88	33.62	11.43	.25	293.
14.000	28.40	10.33	.3334	-.62	11.63	30.83	9.91	.14	276.
15.000	25.49	9.13	3915	-.94	10.50	27.79	8.48	-.02	260.
16.000	22.92	8.52	.3155	-.93	8.60	24.66	8.04	.29	250.
17.000	18.79	7.23	.3145	-1.03	7.10	20.24	6.85	.47	239.
18.000	14.24	7.45	.2329	-1.05	6.05	15.75	6.91	.83	229.
19.000	11.01	7.40	.2247	-.65	5.15	12.57	6.70	1.30	228.
20.000	9.03	7.23	.2539	-.62	4.55	10.52	6.65	1.78	223.
21.000	7.43	7.71	.1675	-.76	4.12	9.42	6.58	2.03	215.
22.000	6.64	8.40	.0839	-.77	4.10	9.28	6.76	1.80	203.
23.000	6.33	7.92	.1671	-.56	3.41	8.79	6.11	1.86	200.
24.000	6.26	8.76	.2172	-.44	3.69	9.50	6.26	1.62	169.
25.000	6.40	9.14	.1662	-.41	4.37	10.16	6.33	1.21	178.
26.000	6.84	9.35	.2812	-.06	3.40	10.17	6.48	1.13	174.
27.000	8.05	10.36	.1828	-.25	3.26	11.24	7.49	.97	154.
28.000	9.33	12.00	.1114	-.83	3.94	12.84	9.04	.93	152.
29.000	10.56	13.48	.0927	-1.23	3.97	14.13	10.50	.95	111.
30.000	11.28	15.69	.3951	.60	5.65	17.68	9.60	.55	199.
32.000	16.28	17.91	.4891	1.49	6.45	21.99	12.04	.34	205.
34.000	20.66	20.00	.5230	2.64	7.64	26.38	13.97	.27	209.
36.000	24.83	22.42	.5142	2.28	8.10	30.58	15.91	.13	207.
38.000	26.54	23.65	.4581	1.86	9.41	32.47	17.47	.13	206.
40.000	26.61	24.97	.3817	1.11	10.71	33.39	18.18	.17	207.
42.000	27.02	25.80	.3462	2.79	10.84	34.07	18.92	.26	208.
44.000	27.89	26.24	.1991	5.42	12.37	36.12	18.48	.13	209.
46.000	30.99	26.35	.1862	7.86	13.07	39.26	18.56	.06	209.
48.000	33.40	25.71	.1939	9.23	14.77	41.85	18.05	.07	209.
50.000	36.70	24.37	.3189	10.55	15.18	43.76	19.09	.38	206.
52.000	40.88	25.57	.2478	10.71	14.24	47.00	20.32	.45	203.
54.000	44.90	27.19	.2245	9.14	15.19	50.48	22.80	.42	201.
56.000	47.54	26.65	.2034	10.10	16.48	53.12	22.79	.65	198.
58.000	50.68	23.48	.1232	10.69	16.97	55.73	20.33	-.19	188.
60.000	59.06	23.89	.0092	10.53	17.53	63.05	22.34	.37	180.
62.000	68.64	24.31	.0530	6.21	18.27	71.87	22.49	-.11	157.
64.000	69.60	27.01	.1040	.83	17.96	72.78	24.43	-.11	130.
66.000	72.55	25.99	.0174	-5.52	18.08	75.38	24.70	-.43	102.
68.000	70.84	28.01	.1654	-10.65	19.46	75.65	23.75	-.20	62.
70.000	67.03	27.04	.3529	-23.77	20.10	75.49	21.89	-.35	43.

TABLE I-3. WIND STATISTICAL PARAMETERS

MARCH

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.15	2.86	-.0142	.88	3.09	3.31	2.75	1.58	415.
2.000	2.85	4.08	-.0505	1.04	5.12	6.24	3.62	1.19	410.
3.000	7.36	5.34	.1519	.19	6.07	9.95	4.53	.48	410.
4.000	10.95	6.70	.2426	.33	7.75	13.79	5.89	.29	410.
5.000	14.36	8.66	.2669	.61	9.65	17.72	7.77	.25	407.
6.000	17.56	10.74	.2950	.79	11.16	21.32	9.69	.38	405.
7.000	20.34	12.95	.3093	.92	12.04	24.39	11.47	.51	402.
8.000	22.21	14.25	.3888	1.06	13.33	26.80	12.49	.52	393.
9.000	24.20	14.94	.3886	1.31	14.31	28.86	13.49	.64	383.
10.000	25.48	14.32	.3759	1.36	14.59	29.92	13.16	.42	372.
11.000	26.66	13.30	.2732	1.13	13.72	30.35	12.46	.32	354.
12.000	28.22	12.76	.1821	1.09	12.94	31.30	12.15	.33	351.
13.000	28.68	10.97	.1753	1.47	10.87	30.76	10.80	-.01	337.
14.000	27.78	9.31	.1333	1.67	8.78	29.20	9.23	-.12	323.
15.000	25.52	6.98	.1396	1.64	[illegible]	[illegible]	[illegible]	.25	[illegible]
16.000	22.30	8.07	.1640	1.17	6.99	23.43	7.95	.08	305.
17.000	19.09	7.92	.1541	.92	5.91	20.05	7.80	.35	289.
18.000	15.78	8.62	.1842	1.11	5.41	16.83	8.39	.64	283.
19.000	12.34	8.71	.1609	1.16	4.79	13.60	8.21	1.04	273.
20.000	9.25	8.17	.2028	.71	3.96	10.51	7.61	1.76	266.
21.000	7.22	8.42	.2993	.41	3.62	9.09	7.33	2.19	255.
22.000	6.52	9.24	.4045	.49	3.87	9.15	7.70	2.02	243.
23.000	6.40	8.56	.4540	.60	3.49	8.75	7.07	2.14	236.
24.000	6.24	9.01	.3741	.57	3.91	9.46	6.79	1.86	226.
25.000	5.76	8.75	.2225	.56	3.94	9.34	6.18	1.74	219.
26.000	6.35	9.01	.2867	.82	3.30	9.65	6.30	.97	206.
27.000	7.24	9.78	.2614	.98	3.27	10.66	6.76	.88	184.
28.000	7.92	10.66	.2077	.91	3.56	11.81	7.08	.84	184.
29.000	8.51	10.68	.1255	.80	3.69	12.33	6.94	.45	137.
30.000	9.90	11.69	.2883	.95	4.65	13.80	8.14	.55	170.
32.000	14.29	13.21	.2217	1.39	5.78	17.65	10.10	.43	172.
34.000	19.82	14.72	.1636	1.79	6.99	22.77	11.93	.28	173.
36.000	25.06	16.34	.3742	1.15	7.10	27.94	12.86	-.02	174.
38.000	27.75	17.27	.2954	.96	7.80	30.58	13.83	.05	175.
40.000	29.70	19.25	.2515	1.08	9.15	32.90	15.93	.15	175.
42.000	30.79	19.87	[illegible]	2.89	[illegible]	[illegible]	16.17	-.01	175.
44.000	31.89	17.66	.2309	5.30	11.98	35.50	15.47	.02	174.
46.000	32.87	17.29	.2040	7.51	12.41	36.70	15.56	.00	174.
48.000	34.11	17.91	.1630	8.23	12.99	38.62	15.09	.29	174.
50.000	35.10	17.27	.3075	10.26	12.34	39.07	16.13	.02	173.
52.000	34.59	17.96	.2392	10.84	11.48	39.13	15.36	-.05	172.
54.000	36.21	17.72	.1632	11.76	12.47	41.07	15.20	-.17	171.
56.000	37.72	18.26	.0882	11.62	13.15	42.45	16.15	.06	165.
58.000	39.78	21.20	.1774	10.14	14.95	44.36	19.70	.28	162.
60.000	39.64	24.25	.1936	10.34	16.77	46.19	20.28	-.08	153.
62.000	41.71	23.80	.0855	7.13	15.73	46.73	20.43	.08	133.
64.000	41.30	23.36	.1248	3.80	15.63	46.04	19.68	.11	113.
66.000	36.15	25.75	.1303	-5.33	13.11	40.81	22.39	.49	88.
68.000	30.42	24.79	.1255	-12.11	15.58	39.22	19.59	.24	60.
70.000	21.45	23.22	-.2168	-15.38	22.04	36.26	19.80	.91	43.

TABLE I-4. WIND STATISTICAL PARAMETERS

APRIL

STATION = 722690 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.45	2.52	-.0205	.85	3.22	3.30	2.59	.95	420.
2.000	3.13	3.73	.0907	1.68	4.63	6.01	3.44	.82	414.
3.000	6.62	4.96	.1564	2.14	5.29	9.02	4.42	.43	411.
4.000	9.96	6.42	.2656	3.44	6.42	12.50	6.10	.44	403.
5.000	12.93	7.81	.3902	4.24	7.89	15.82	7.61	.50	400.
6.000	16.10	9.31	.4336	5.01	8.97	19.08	9.34	.50	398.
7.000	18.73	10.83	.4365	5.70	10.46	22.10	11.01	.50	395.
8.000	21.18	12.38	.4340	6.67	11.55	25.02	12.39	.51	393.
9.000	23.01	12.90	.3724	7.07	12.18	27.09	12.66	.34	392.
10.000	24.78	12.81	.3740	7.71	12.47	28.81	12.75	.12	388.
11.000	26.24	12.70	.3753	7.92	12.61	30.09	12.89	.08	372.
12.000	27.29	12.91	.3823	7.68	12.29	30.85	13.03	.34	370.
13.000	26.91	11.79	.3626	6.31	11.25	30.05	11.22	.45	349.
14.000	26.13	9.78	.2643	5.74	8.99	28.20	9.66	.28	341.
15.000	23.12	8.53	.2714	5.08	8.38	25.13	8.46	.03	326.
16.000	20.09	7.59	.1867	4.73	6.88	21.74	7.62	.22	306.
17.000	16.10	6.73	.1393	3.91	6.04	17.62	6.78	.38	276.
18.000	11.24	6.74	.1020	3.13	5.35	12.94	6.53	1.01	271.
19.000	6.90	6.10	.0856	1.98	4.38	8.74	5.62	1.59	257.
20.000	4.00	4.72	.0963	1.26	3.55	5.99	4.07	1.39	248.
21.000	2.32	4.66	.1695	.84	2.90	4.99	3.35	1.84	237.
22.000	1.42	4.81	.1420	.92	2.99	4.81	3.43	2.16	235.
23.000	1.14	4.13	.2166	.60	2.12	3.99	2.68	1.39	214.
24.000	.85	5.06	.3001	.43	2.85	5.02	3.05	.96	210.
25.000	1.06	5.05	.2609	.25	2.82	5.06	2.98	.75	205.
26.000	1.79	4.86	.1600	.26	2.62	4.97	2.99	.64	197.
27.000	3.27	5.00	.1010	.45	2.86	5.81	3.19	.79	180.
28.000	5.11	5.15	.0583	.70	3.09	7.05	3.57	.34	180.
29.000	7.36	5.68	.0129	.63	2.97	8.83	4.19	.26	114.
30.000	8.43	6.47	.1233	1.27	4.21	10.22	5.26	.78	174.
32.000	11.57	7.80	.0781	1.95	5.06	13.37	6.72	.33	176.
34.000	15.07	9.22	.2397	1.58	5.86	16.80	8.15	.26	180.
36.000	16.85	10.54	.2889	1.47	5.78	18.44	9.50	.27	181.
38.000	16.74	12.80	.2600	-.16	[illegible]	[illegible]	10.33	.37	[illegible]
40.000	14.08	14.72	.2212	-1.24	8.22	18.25	12.26	.63	181.
42.000	10.29	15.09	.1067	1.88	8.96	16.81	11.57	1.02	180.
44.000	11.39	14.85	.2180	3.43	8.50	17.33	11.53	.92	180.
46.000	10.67	16.43	.2981	4.06	8.08	17.45	12.55	1.13	179.
48.000	8.66	17.51	.2093	4.28	10.08	18.64	12.35	.99	179.
50.000	8.28	17.38	.1597	5.09	8.17	17.47	12.51	1.37	179.
52.000	6.69	17.79	.2258	5.17	8.24	17.17	12.64	1.54	174.
54.000	3.85	16.22	.1470	4.42	8.88	15.99	10.92	1.31	170.
56.000	.34	18.60	.3032	4.74	12.09	19.42	11.64	.81	167.
58.000	-.48	19.60	.2351	7.74	11.09	20.89	11.34	.91	151.
60.000	-.83	18.66	.2207	7.26	11.81	20.07	11.65	1.15	141.
62.000	.18	18.86	.0620	6.56	10.71	19.24	11.85	1.41	123.
64.000	.51	18.04	.0086	4.69	12.25	19.41	10.85	.85	113.
66.000	.43	16.77	.0948	1.28	11.45	17.35	10.47	1.63	86.
68.000	-.15	16.58	-.0407	-2.94	11.14	16.91	10.84	1.17	64.
70.000	-3.98	14.64	.1974	-4.88	14.75	19.02	10.04	.08	37.

TABLE I-5. WIND STATISTICAL PARAMETERS

MAY

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.40	2.57	-.0115	1.32	3.18	3.41	2.64	1.39	489.
2.000	2.42	3.30	.0109	2.35	4.49	5.63	3.27	1.22	488.
3.000	4.64	3.98	.1402	1.91	4.36	6.80	3.69	.94	486.
4.000	6.62	5.21	.3295	2.35	5.37	8.98	4.97	.78	483.
5.000	8.83	6.89	.3597	2.97	6.78	11.69	6.59	.85	482.
6.000	10.64	7.90	.3391	3.01	7.62	13.56	7.66	.78	476.
7.000	12.50	9.30	.3867	2.77	7.83	15.17	9.02	.73	473.
8.000	14.27	10.56	.3832	2.84	8.58	17.05	10.29	.75	473.
9.000	15.93	11.31	.3731	3.03	9.28	18.85	11.03	.74	466.
10.000	17.72	11.83	.3556	3.19	9.99	20.76	11.52	.65	459.
11.000	19.49	12.04	.3380	3.15	10.48	22.47	11.81	.49	449.
12.000	21.43	12.41	.3346	3.05	10.85	24.35	12.14	.46	447.
13.000	22.14	11.69	.3571	2.98	10.27	24.72	11.41	.42	431.
14.000	20.81	9.59	.3436	3.03	9.04	22.97	9.38	.27	406.
15.000	18.21	7.88	.2836	2.67	8.25	20.20	7.00	.32	[illegible]
16.000	13.95	6.11	.3216	1.93	7.33	15.86	6.13	.52	342.
17.000	9.43	5.36	.2394	1.63	6.18	11.41	5.31	.60	315.
18.000	5.20	5.15	.2291	1.56	4.99	7.67	4.69	.90	304.
19.000	2.03	4.16	.1864	1.00	3.56	4.98	3.21	1.37	295.
20.000	-.21	4.14	.1504	.73	2.92	4.34	2.72	1.45	287.
21.000	-1.49	3.99	.1776	.36	2.78	4.46	2.47	1.00	275.
22.000	-2.55	4.13	.2290	.37	2.47	4.75	2.69	.92	275.
23.000	-3.01	3.78	.2544	.31	2.24	4.70	2.51	.49	261.
24.000	-3.31	4.06	.1571	.26	2.68	5.18	2.80	.73	261.
25.000	-3.46	4.12	.1667	.13	2.49	5.20	2.84	.57	245.
26.000	-3.21	4.50	.2705	.19	2.55	5.29	3.00	.67	228.
27.000	-2.55	5.02	.3310	.23	2.90	5.49	3.14	.98	190.
28.000	-1.89	5.12	.2717	.17	2.58	5.23	3.01	1.31	190.
29.000	-.63	5.39	.2174	.26	2.81	5.41	2.80	1.21	122.
30.000	-.85	5.50	.0408	.85	3.41	5.76	3.17	.83	203.
32.000	.00	6.82	-.0254	1.72	3.69	6.74	4.18	1.15	204.
34.000	.17	6.73	-.0177	1.19	3.98	6.90	3.85	.80	212.
36.000	-.82	8.77	.0177	.52	3.73	8.30	4.75	.79	212.
38.000	-3.48	8.73	-.2571	.27	4.25	9.09	4.85	.53	212.
40.000	-6.41	8.93	.0355	.00	5.00	10.50	5.94	.68	212.
42.000	-9.45	8.92	.0350	1.09	4.76	12.11	6.79	.54	213.
44.000	-13.48	10.02	-.1229	1.88	5.59	15.98	7.83	.18	213.
46.000	-16.11	10.44	-.1026	2.92	6.20	18.69	8.10	.42	212.
48.000	-17.81	10.26	.0107	4.55	6.72	20.39	8.50	.17	211.
50.000	-19.80	9.30	.0324	5.52	8.08	22.41	8.45	.10	210.
52.000	-21.05	9.54	.0412	5.01	6.24	22.74	8.99	-.05	209.
54.000	-22.18	10.53	.0010	4.34	6.99	23.97	9.79	.06	207.
56.000	-25.07	10.72	-.0175	3.44	8.24	26.92	9.91	-.06	203.
58.000	-27.85	10.31	.0342	4.13	8.63	29.70	9.51	.23	195.
60.000	-30.27	11.77	.1416	3.11	10.10	32.65	10.00	-.07	178.
62.000	-33.09	12.71	.1712	4.24	11.98	35.90	11.29	-.08	165.
64.000	-32.03	14.56	.1145	3.21	11.28	34.75	12.91	.02	131.
66.000	-30.47	17.50	.1240	-.07	13.15	34.04	15.69	.43	98.
68.000	-27.51	18.32	-.0135	-4.09	15.59	32.91	16.29	.31	75.
70.000	-28.30	17.30	.0207	-7.14	19.43	35.13	16.90	.62	45.

TABLE I-6. WIND STATISTICAL PARAMETERS

JUNE

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.248	.13	2.48	-.0950	1.23	3.25	3.40	2.57	1.17	389.
2.000	1.60	3.28	-.0573	2.51	4.26	5.24	3.20	.86	388.
3.000	3.11	3.98	.1798	1.85	4.16	5.90	3.37	.71	388.
4.000	3.87	5.26	.4116	1.57	5.59	7.66	4.18	.86	388.
5.000	4.86	6.84	.4590	1.66	7.36	9.85	5.50	.77	388.
6.000	5.98	7.85	.5106	1.63	7.72	10.91	6.34	.73	387.
7.000	7.25	8.35	.4966	1.90	7.77	11.65	7.10	.70	387.
8.000	8.43	8.68	.4695	2.13	8.17	12.58	7.70	.71	385.
9.000	9.85	8.95	.4253	2.34	8.91	14.02	8.08	.74	384.
10.000	11.81	9.45	.3576	2.47	9.96	16.13	8.58	.69	375.
11.000	13.80	10.28	.3010	2.49	11.06	18.47	9.10	.53	364.
12.000	15.44	10.40	.3161	2.77	11.15	19.85	9.17	.41	364.
13.000	16.22	10.16	.3963	2.97	10.69	20.31	8.76	.43	359.
14.000	15.35	9.05	.4065	3.04	9.14	18.57	8.05	.39	345.
15.000	12.60	7.67	.3746	3.17	7.48	15.23	7.16	.57	334.
16.000	8.48	5.73	.2300	2.65	5.68	10.72	5.39	.54	310.
17.000	3.93	4.67	.0588	1.90	4.42	6.90	3.55	.65	304.
18.000	-.19	4.16	.0354	1.35	3.43	4.89	2.62	.77	303.
19.000	-3.08	3.68	-.0208	.99	2.90	5.10	2.51	.62	284.
20.000	-5.16	3.65	.0398	.84	2.50	6.26	2.77	.62	281.
21.000	-6.57	3.68	.1769	.84	2.42	7.36	3.02	.09	273.
22.000	-7.67	3.31	.1640	.55	1.83	8.02	3.00	-.17	271.
23.000	-8.57	3.34	.1768	.56	1.69	8.83	3.13	-.26	253.
24.000	-9.36	3.85	.0800	.72	2.20	9.74	3.60	-.10	253.
25.000	-9.63	3.88	.0859	.85	1.98	9.96	3.65	-.13	238.
26.000	-9.84	3.88	.0369	.69	1.82	10.08	3.75	-.08	227.
27.000	-10.39	4.13	-.0033	.39	2.32	10.74	3.90	.07	206.
28.000	-10.71	3.99	.0319	.50	1.91	10.92	3.91	-.04	194.
29.000	-11.10	4.29	.0977	.69	2.77	11.52	4.12	.05	146.
30.000	-12.65	4.36	.2089	1.01	3.06	13.10	4.20	.19	184.
32.000	-13.65	4.91	-.0617	1.20	3.18	14.13	4.70	-.07	184.
34.000	-15.13	5.40	.1556	.79	3.70	15.65	5.25	-.02	194.
36.000	-17.15	6.17	.1055	1.00	3.52	17.65	5.81	.00	191.
38.000	-20.77	5.66	-.1202	.24	3.58	21.10	5.70	.14	[illegible]
40.000	-23.70	6.81	.1537	-.01	4.83	24.22	6.66	-.05	192.
42.000	-28.63	8.05	.0253	.12	5.24	29.17	7.79	-.08	192.
44.000	-32.76	7.11	-.0328	1.45	5.43	33.25	7.04	-.04	192.
46.000	-34.90	7.61	-.0563	2.68	6.90	35.71	7.41	-.29	191.
48.000	-37.52	8.09	-.0826	4.27	6.96	38.42	7.98	.07	190.
50.000	-40.07	8.91	-.0330	5.31	6.99	41.02	8.90	-.06	188.
52.000	-42.39	8.90	.0289	5.60	8.16	43.58	8.67	.11	187.
54.000	-45.10	10.70	-.0029	5.21	7.84	46.13	10.42	.08	186.
56.000	-48.96	10.79	.0972	4.26	9.81	50.09	10.86	.51	184.
58.000	-51.47	11.91	.0142	3.27	10.67	52.68	11.83	.05	178.
60.000	-53.22	16.60	.0906	2.12	11.36	54.67	15.87	.30	166.
62.000	-54.18	17.44	-.0481	2.63	13.98	56.15	16.98	-.08	142.
64.000	-54.39	17.96	.1619	1.99	15.83	57.00	16.84	.13	121.
66.000	-54.63	18.36	.1223	4.00	19.28	58.23	17.75	.21	88.
68.000	-48.20	23.23	.1255	4.73	18.53	52.33	21.98	.17	58.
70.000	-42.88	26.58	.0949	-3.73	18.86	47.32	25.76	.68	34.

TABLE I-7. WIND STATISTICAL PARAMETERS

JULY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.248	.22	2.06	-.1391	.99	3.04	3.01	2.32	.96	352.
2.000	-.22	2.11	-.1336	2.55	3.61	4.18	2.56	1.08	351.
3.000	.00	2.92	.0433	1.39	3.25	4.04	2.14	.67	349.
4.000	-1.36	4.01	.1752	-.01	4.23	5.26	2.85	.83	347.
5.000	-2.68	4.47	.2320	-.76	4.98	6.39	3.40	.79	345.
6.000	-2.38	4.77	.1692	-.12	4.70	6.25	3.37	.49	344.
7.000	-1.66	4.87	.1043	.58	4.85	6.10	3.35	.75	344.
8.000	-1.01	5.34	.0887	.72	5.31	6.77	3.51	.87	344.
9.000	-.56	6.19	.1011	.64	5.76	7.57	3.85	.87	342.
10.000	.00	7.39	.1733	.59	6.12	8.53	4.41	.67	339.
11.000	.41	8.70	.2181	.32	6.88	9.79	5.22	.55	337.
12.000	.63	9.28	.1885	-.09	6.93	10.19	5.52	.49	336.
13.000	.57	9.23	.1430	-.38	6.91	10.17	5.45	.51	331.
14.000	.27	7.90	.0589	-.52	6.30	8.94	4.72	.52	318.
15.000	-.97	5.86	.1009	-.17	5.22	7.10	3.46	.34	306.
16.000	-2.67	4.61	.2203	-.07	3.89	5.80	3.13	.59	275.
17.000	-4.62	4.11	.1613	.13	3.21	6.11	3.34	.60	263.
18.000	-6.61	3.26	.0622	.41	3.03	7.43	2.92	.30	263.
19.000	-8.23	2.93	.2199	.49	2.46	8.65	2.78	.18	252.
20.000	-9.90	3.19	.0895	.27	2.21	10.19	3.07	.24	244.
21.000	-11.47	3.24	.1811	.52	2.65	11.83	3.06	.10	241.
22.000	-12.66	2.38	.0848	.67	1.84	12.83	2.92	-.10	234.
23.000	-13.67	2.99	.0048	.69	1.64	13.80	2.95	-.05	221.
24.000	-14.51	3.18	-.1455	.65	1.86	14.65	3.17	-.02	221.
25.000	-15.41	3.17	-.1240	.66	1.92	15.54	3.16	.02	208.
26.000	-16.37	3.36	-.1397	.71	2.27	16.54	3.36	.06	188.
27.000	-17.51	3.80	-.1206	.59	2.65	17.72	3.81	.10	180.
28.000	-18.00	3.50	.0006	.60	1.91	18.11	3.49	.05	162.
29.000	-18.93	3.82	-.0269	.51	2.64	19.12	3.81	.47	114.
30.000	-21.75	3.83	.0711	1.00	3.30	22.03	3.77	.02	165.
32.000	-22.58	4.38	.1853	1.85	3.32	22.91	4.30	-.09	165.
34.000	-23.13	5.20	.2329	1.50	4.01	23.56	5.05	.00	167.
36.000	-26.29	5.61	.1483	.81	3.91	26.62	5.48	-.28	167.
38.000	-30.17	5.81	.0856	.64	4.63	30.51	5.86	.23	166.
40.000	-33.65	5.90	.1589	-.51	4.89	34.03	5.78	.30	166.
42.000	-39.52	6.75	.1362	.82	5.39	39.91	6.67	.06	166.
44.000	-42.92	7.08	.1384	3.18	5.89	43.46	6.9[illegible]	.11	166.
46.000	-44.63	7.51	.0033	4.40	7.31	45.45	7.41	-.50	164.
48.000	-46.76	8.30	.0899	6.02	7.13	47.71	8.11	.11	164.
50.000	-50.04	9.44	-.0128	5.50	7.16	50.89	9.20	-.57	164.
52.000	-53.79	9.89	.0362	5.35	7.23	54.56	9.75	-.64	164.
54.000	-56.71	10.36	.1339	6.33	9.40	57.85	10.23	.74	162.
56.000	-57.92	12.22	.1754	3.32	10.53	58.96	12.23	.41	156.
58.000	-60.90	15.65	.1258	4.27	11.54	62.22	15.26	.41	148.
60.000	-61.84	21.76	.0693	3.34	16.40	64.77	19.48	1.07	137.
62.000	-61.22	24.99	-.2173	5.86	16.11	64.89	21.24	.29	122.
64.000	-56.26	28.64	.0373	2.13	22.52	61.59	26.41	.48	106.
66.000	-50.95	34.45	.0369	-.89	21.19	57.15	30.96	.79	86.
68.000	-39.04	32.14	.1059	-4.33	23.92	48.13	28.61	1.51	60.
70.000	-20.23	33.78	.1460	-5.10	26.47	40.27	24.95	1.21	37.

TABLE I-8. WIND STATISTICAL PARAMETERS

AUGUST

STATION = 722699 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.248	.05	1.88	-.1692	.62	2.84	2.69	2.18	2.16	372.
2.000	.10	2.14	-.2456	1.99	3.65	3.94	2.52	1.41	371.
3.000	.45	3.03	.0661	1.15	3.25	4.04	2.17	.82	371.
4.000	-.41	4.17	.2859	-.14	4.05	5.11	2.80	1.02	369.
5.000	-1.18	4.78	.3305	-.55	4.82	6.17	3.08	.60	368.
6.000	-.79	4.66	.2299	-.12	4.92	5.98	3.28	.93	365.
7.000	-.14	4.72	.2033	-.13	5.19	6.07	3.52	1.08	361.
8.000	.40	5.75	.2669	-.34	6.03	7.11	4.37	1.28	360.
9.000	.99	6.46	.2795	-.43	7.04	8.12	5.13	1.15	357.
10.000	1.80	7.41	.2488	-.61	7.83	9.30	5.76	.94	355.
11.000	2.45	8.50	.2371	-1.04	8.80	10.58	6.68	.78	351.
12.000	2.34	9.06	.2724	-1.63	8.91	11.20	6.80	.70	349.
13.000	2.80	9.28	.2476	-1.82	8.45	11.25	6.47	.67	346.
14.000	2.23	8.24	.1078	-1.29	7.56	10.03	5.48	.74	336.
15.000	.95	6.52	.1722	-.80	6.20	7.98	4.34	.82	328.
16.000	-.81	5.03	.2494	-.06	4.65	6.07	3.26	.75	305.
17.000	-3.04	4.17	.2914	.30	3.29	5.49	2.71	.56	293.
18.000	-4.93	3.64	.1793	.26	2.70	6.13	2.69	.45	293.
19.000	-6.87	3.38	.0855	.02	2.13	7.32	3.10	.08	283.
20.000	-8.70	3.06	.0431	.31	2.09	8.99	2.96	.09	279.
21.000	-10.26	3.04	.1606	.67	2.12	10.54	2.90	.10	[illegible]
22.000	-11.39	2.66	.0586	.56	1.73	11.56	2.54	.03	[illegible]
23.000	-12.57	2.76	.0554	.50	1.74	12.72	2.65	.25	[illegible]
24.000	-13.90	2.99	-.0231	.48	1.93	14.06	2.89	.40	[illegible]
25.000	-14.75	3.07	.0315	.64	1.85	14.90	2.96	.09	[illegible]
26.000	-15.62	3.29	.0270	.73	1.75	15.75	3.21	-.01	206.
27.000	-16.54	3.70	-.1140	.69	2.22	16.70	3.68	.15	191.
28.000	-17.3	3.12	-.1016	.55	1.91	17.43	3.11	-.11	175.
29.000	-18.	3.36	.0311	.40	2.91	18.39	3.32	-.48	137.
30.000	-21.1	3.59	-.0253	1.10	3.10	21.41	3.62	.19	162.
32.000	-21.53	4.96	.1293	1.80	3.17	21.85	4.88	.00	166.
34.000	-21.52	5.29	-.0749	1.32	3.68	21.88	5.25	-.35	166.
36.000	-24.23	5.14	.1649	.20	3.99	24.58	5.03	-.23	165.
38.000	-26.26	6.71	.1340	.65	4.41	26.63	[illegible]	[illegible]	[illegible]
40.000	-28.46	7.97	.1467	1.42	5.20	29.18	7.25	-.22	167.
42.000	-31.08	8.73	.0909	-.18	5.42	31.74	7.98	.11	167.
44.000	-34.92	8.89	.0294	1.55	6.60	35.74	8.18	-.09	164.
46.000	-37.62	9.35	-.1083	4.80	7.68	38.80	8.09	-.06	165.
48.000	-38.03	10.06	-.0258	6.42	8.10	39.60	9.24	-.70	164.
50.000	-37.77	11.64	.0656	6.45	9.28	39.77	10.38	-.33	164.
52.000	-38.96	13.66	.1545	6.03	10.28	41.28	11.90	-.47	163.
54.000	-38.78	14.90	.0858	5.79	10.69	41.32	12.88	-.65	160.
56.000	-36.39	19.83	.0172	5.38	9.71	39.32	17.15	-.05	157.
58.000	-34.45	20.76	.0081	5.07	13.38	38.56	18.27	.06	152.
60.000	-30.14	22.32	.0131	3.27	13.64	35.41	18.63	.34	143.
62.000	-26.10	24.69	-.0367	1.84	13.15	32.44	20.28	.68	126.
64.000	-17.08	20.77	.1294	.26	14.80	26.37	15.59	1.40	110.
66.000	-9.16	22.91	.0209	-4.91	14.76	23.95	16.48	1.88	88.
68.000	-3.85	24.90	.1190	-6.75	22.94	28.55	19.49	2.18	64.
70.000	2.10	22.01	-.0718	-6.03	23.29	27.69	16.82	1.26	42.

TABLE I-9. WIND STATISTICAL PARAMETERS

SEPTEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.01	2.03	-.1099	.70	2.87	2.70	2.35	1.77	374.
2.000	.67	2.72	-.0336	1.91	3.97	4.40	2.79	.84	372.
3.000	2.27	4.08	.0794	1.32	4.04	5.41	3.24	.89	371.
4.000	2.87	5.54	.2138	.86	4.85	6.76	4.17	.94	369.
5.000	3.96	6.27	.2423	.49	5.62	7.86	5.00	1.10	367.
6.000	5.39	6.62	.2056	.89	6.33	8.92	5.83	1.36	361.
7.000	6.98	7.03	.2692	1.31	7.24	10.54	6.40	1.31	360.
8.000	8.94	7.33	.2845	1.52	8.20	12.49	6.86	1.04	360.
9.000	11.03	7.80	.2925	1.80	9.11	14.55	7.54	.77	358.
10.000	13.28	8.46	.2802	1.97	9.96	16.79	8.31	.48	357.
11.000	15.62	9.37	.2933	1.82	10.58	19.08	9.10	.37	353.
12.000	17.65	9.64	.2817	1.74	10.44	20.66	9.45	.30	352.
13.000	18.20	9.79	.2581	1.59	9.76	20.87	9.44	.12	349.
14.000	16.44	9.16	.2541	1.67	8.54	18.76	8.82	.42	344.
15.000	13.08	7.15	.2240	1.79	6.91	15.01	6.82	.51	334.
16.000	8.90	5.48	.2123	.84	5.39	10.67	4.99	.41	308.
17.000	4.71	4.57	.1639	.58	4.23	6.92	3.66	.62	303.
18.000	.90	4.40	.1102	.56	3.52	4.99	2.80	.88	298.
19.000	-1.42	3.55	.1087	.69	2.76	4.22	2.13	.57	284.
20.000	-3.27	3.40	.1908	.68	2.38	4.77	2.36	.58	278.
21.000	-4.47	3.89	.1842	.49	2.61	5.83	2.82	.48	265.
22.000	-5.54	3.73	.1805	.19	2.07	6.34	2.95	.54	264.
23.000	-6.44	3.71	.1000	.28	1.73	6.94	3.20	.24	252.
24.000	-7.40	4.08	.0468	.51	1.97	7.95	3.49	.11	252.
25.000	-8.10	4.21	.0203	.70	2.08	8.64	3.66	.14	243.
26.000	-8.54	4.29	-.0151	.75	2.10	9.04	3.82	.17	224.
27.000	-8.84	4.79	-.0124	.72	2.58	9.49	4.26	.30	215.
28.000	-8.97	4.72	.0244	.62	2.00	9.46	4.18	.27	209.
29.000	-9.46	5.08	.1353	.37	2.81	10.20	4.39	.06	155.
30.000	-10.65	5.65	-.0302	.96	3.04	11.39	5.06	.22	203.
32.000	-9.01	6.07	.0661	3.00	3.70	10.80	4.89	.18	208.
34.000	-6.14	7.06	.0971	1.77	3.97	9.06	4.92	.49	212.
36.000	-6.69	8.39	.0311	.47	4.28	9.59	6.45	.99	212.
38.000	-7.78	8.59	.0224	-.76	4.76	10.78	6.41	.66	214.
40.000	-8.52	9.05	-.0135	.78	5.65	11.88	6.75	.45	217.
42.000	-9.85	9.79	-.0871	1.50	6.09	13.17	7.65	.53	217.
44.000	-10.51	11.57	.0702	2.65	7.11	14.53	9.53	1.02	[illegible]
46.000	-9.06	11.37	.0943	3.92	7.35	14.31	8.70	.75	216.
48.000	-6.51	14.16	.0403	5.81	7.44	15.75	9.29	1.35	214.
50.000	-3.30	14.32	-.0916	5.00	7.79	[illegible]	8.86	.95	216.
52.000	-1.96	14.23	-.0001	5.58	8.79	[illegible]	9.43	1.31	206.
54.000	-.54	15.48	-.0416	5.50	8.28	15.83	9.33	.89	198.
56.000	3.08	14.04	-.0671	6.09	10.10	16.44	8.61	.88	190.
58.000	5.83	13.64	-.0936	4.46	11.27	16.34	9.95	.95	185.
60.000	8.34	14.15	-.0611	4.77	10.55	17.77	9.32	.78	176.
62.000	10.22	14.92	-.2604	4.06	11.07	18.93	10.31	.94	160.
64.000	12.67	16.34	-.0861	3.52	15.75	22.93	12.64	1.40	142.
66.000	17.12	16.58	.2960	2.11	16.27	25.22	14.05	1.42	99.
68.000	16.22	18.25	-.0473	.29	15.77	25.96	12.85	.90	71.
70.000	23.47	17.44	.2304	-6.89	18.96	32.67	13.62	.55	55.

TABLE I-10. WIND STATISTICAL PARAMETERS

OCTOBER

STATION = 722696   WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.10	2.29	-.1359	.47	2.99	2.99	2.33	1.49	380.
2.000	1.97	3.27	.0529	1.35	4.82	5.20	3.25	1.11	377.
3.000	4.45	5.15	.0858	1.05	5.74	8.00	4.03	.72	375.
4.000	6.99	6.71	.1874	1.22	7.24	10.89	5.39	.83	373.
5.000	9.24	8.31	.2166	1.40	8.56	13.41	7.04	.85	371.
6.000	11.10	9.31	.2284	1.12	9.57	15.33	8.22	.78	366.
7.000	12.85	10.48	.2562	1.09	10.76	17.49	9.26	.81	364.
8.000	14.41	11.07	.3148	1.50	12.29	18.56	10.01	.72	364.
9.000	15.94	11.09	.3238	1.91	13.62	21.41	10.35	.62	360.
10.000	17.60	11.32	.3456	2.00	14.22	23.11	10.46	.43	356.
11.000	19.54	11.77	.3598	2.22	14.33	24.85	10.60	.24	348.
12.000	21.61	12.22	.3404	2.41	13.98	26.41	10.93	.29	348.
13.000	22.67	11.58	.3133	2.13	12.78	26.54	10.53	.20	340.
14.000	21.32	9.95	.2645	1.98	10.68	24.22	9.21	.07	337.
15.000	18.32	8.54	.2680	1.23	9.08	20.69	8.02	.15	334.
16.000	14.04	6.63	.2313	.36	7.04	15.82	6.35	.37	312.
17.000	9.77	5.37	.2213	.10	5.71	11.47	4.97	.52	301.
18.000	5.74	5.00	.1730	.22	4.62	7.88	4.13	.77	298.
19.000	3.75	4.41	.1468	.27	3.50	5.92	3.40	1.09	292.
20.000	2.98	4.36	.0858	.52	3.06	5.23	3.18	1.43	279.
21.000	2.42	4.66	-.0668	.62	2.84	5.18	3.01	1.01	269.
22.000	1.84	4.50	-.0047	.44	2.65	4.78	2.82	1.16	268.
23.000	1.70	5.01	-.0315	.32	2.28	4.88	3.05	.83	253.
24.000	1.40	6.34	-.0138	.10	2.86	6.12	3.56	.77	248.
25.000	2.02	6.42	.0900	.08	2.38	6.03	3.79	.93	238.
26.000	2.35	6.81	.1772	.28	2.22	6.32	4.10	.87	226.
27.000	3.10	7.62	.1496	.43	2.84	7.46	4.47	.71	210.
28.000	4.56	7.94	.1381	.52	3.00	8.22	5.04	.82	210.
29.000	6.72	8.34	.1428	.64	3.49	9.54	6.01	.71	162.
30.000	5.92	8.64	.1448	1.21	3.83	10.11	6.45	.61	180.
32.000	9.69	10.74	.3204	2.77	4.72	12.60	8.95	.67	180.
34.000	15.09	12.55	.4395	3.78	5.87	17.29	11.61	.49	181.
36.000	19.06	15.09	.5505	2.94	5.60	20.85	14.00	.34	183.
38.000	23.23	16.38	.3808	2.13	6.09	24.61	15.58	.31	182.
40.000	24.98	17.49	.2105	.33	5.76	26.42	16.27	.23	182.
42.000	26.33	17.71	.2258	.66	6.17	28.04	16.07	.20	182.
44.000	29.21	18.22	.2805	3.90	7.24	31.07	16.95	.09	181.
46.000	33.40	19.15	.2602	6.67	8.47	35.57	18.23	-.04	182.
48.000	38.56	19.77	.3403	8.42	9.59	40.85	19.28	-.13	180.
50.000	42.46	21.18	.3757	8.23	9.48	44.85	20.37	-.04	178.
52.000	46.07	22.03	.3556	8.90	9.80	48.09	21.68	.02	177.
54.000	50.08	22.38	.3989	8.92	10.87	52.49	21.18	-.24	174.
56.000	51.43	21.22	.4427	8.73	11.40	53.39	21.21	-.28	171.
58.000	52.75	21.41	.3880	7.00	10.55	54.21	21.50	-.11	168.
60.000	53.30	22.31	.3372	7.07	12.62	55.32	22.06	-.09	163.
62.000	52.74	23.53	.1637	4.97	12.68	54.58	23.24	-.15	147.
64.000	53.08	25.09	.1207	2.47	14.75	55.47	24.34	.13	125.
66.000	52.21	26.38	.0838	-.05	19.92	55.92	26.20	.32	90.
68.000	52.03	25.54	.0383	-5.28	22.87	57.70	23.89	.08	60.
70.000	44.77	28.95	.3783	-9.45	28.66	53.35	29.78	1.91	37.

TABLE I-11. WIND STATISTICAL PARAMETERS

NOVEMBER

STATION = 722896 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	-.28	2.15	-.1273	.04	3.04	2.76	2.51	1.69	394.
2.000	2.08	3.01	.0659	.10	4.90	5.09	3.37	.85	394.
3.000	5.64	5.41	.0981	-.81	5.95	8.72	4.58	.60	393.
4.000	9.27	7.01	.1325	-.98	7.66	12.41	6.38	.39	392.
5.000	11.97	8.47	.1717	-1.16	9.43	15.63	7.80	.38	391.
6.000	14.44	9.92	.2239	-.95	11.08	18.56	9.25	.47	382.
7.000	16.54	10.91	.2594	-.88	12.83	21.21	10.36	.69	376.
8.000	18.50	11.75	.3083	-.84	14.50	23.70	11.35	.65	375.
9.000	20.14	12.08	.3154	-.79	15.15	25.44	11.58	.35	371.
10.000	21.88	12.76	.3252	-.56	15.31	27.05	12.01	.29	367.
11.000	23.77	13.19	.3475	-.34	14.85	28.50	12.11	.18	354.
12.000	25.37	13.00	.3282	.08	14.50	29.63	12.02	.14	352.
13.000	24.88	12.35	.3338	-.10	13.05	28.51	11.33	.18	340.
14.000	23.36	10.42	.2137	.08	11.09	26.08	9.82	.12	323.
15.000	21.12	9.37	.2374	.14	10.69	23.77	9.10	.22	312.
16.000	17.14	8.02	.2198	.41	8.92	19.40	7.82	.39	280.
17.000	13.45	7.01	.2514	.12	6.87	15.23	6.73	.56	266.
18.000	10.02	6.61	.1987	.20	5.92	11.97	5.98	1.04	256.
19.000	7.37	5.72	.3024	.04	4.53	8.95	5.23	1.35	249.
20.000	6.17	5.34	.3488	-.30	3.60	7.67	4.56	1.51	244.
21.000	5.44	5.58	.2950	-.44	3.39	7.32	4.34	1.23	236.
22.000	4.36	6.40	.2552	-.33	3.42	7.07	4.65	1.29	229.
23.000	4.95	6.04	.4656	-.28	2.95	7.02	4.51	1.13	220.
24.000	5.51	6.79	.4775	-.22	3.32	7.84	5.10	1.29	211.
25.000	6.10	7.06	.3956	-.48	3.30	8.33	5.35	1.19	206.
26.000	7.22	7.40	.4702	-.28	3.21	9.24	5.63	1.01	201.
27.000	8.65	8.23	.5016	-.23	3.44	10.62	6.44	.97	172.
28.000	10.43	9.51	.4754	-.34	4.07	12.61	7.52	.90	172.
29.000	12.61	10.35	.5147	-.39	4.65	14.71	8.43	.84	104.
30.000	16.88	12.03	.3894	1.21	5.76	18.34	11.30	.72	174.
32.000	21.25	14.18	.3940	1.79	6.73	22.61	13.78	.64	180.
34.000	27.18	15.63	.3928	2.35	8.20	28.60	15.41	.51	184.
36.000	33.58	15.98	.4580	2.23	7.80	34.55	15.97	.31	187.
38.000	38.20	16.47	.3457	.71	7.80	39.04	16.33	.22	190.
40.000	41.59	16.46	.3925	.58	7.19	42.31	16.17	.21	188.
42.000	43.30	16.83	.3819	1.34	7.47	43.96	16.81	-.09	189.
44.000	47.83	18.73	.3427	4.13	9.99	48.98	18.87	[illegible]	[illegible]
46.000	54.00	20.57	.4587	7.94	10.29	55.44	20.83	-.06	189.
48.000	60.17	22.88	.4804	10.88	10.90	61.94	23.33	.05	187.
50.000	64.64	23.55	.5141	11.41	12.13	66.49	24.27	.15	186.
52.000	68.20	24.96	.5531	12.36	14.75	70.44	26.12	.10	181.
54.000	70.32	26.26	.5189	13.22	14.78	72.63	27.44	.01	181.
56.000	71.17	28.09	.4449	11.28	14.84	73.28	29.80	.07	174.
58.000	71.58	30.06	.3793	11.46	14.56	73.95	30.01	.25	172.
60.000	70.93	30.29	.1884	10.71	15.42	73.83	29.13	.52	160.
62.000	68.97	31.18	.1929	8.02	15.80	71.63	30.19	1.11	145.
64.000	63.16	33.23	.2102	3.43	17.79	67.26	29.91	1.16	125.
66.000	56.26	34.37	.1546	-1.45	20.61	61.58	31.23	.83	103.
68.000	52.97	38.31	-.1519	-7.40	22.38	59.53	35.74	.65	79.
70.000	35.47	33.68	.0573	-8.29	21.20	46.56	27.05	.32	62.

TABLE I-12. WIND STATISTICAL PARAMETERS

DECEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.248	-.31	1.97	-.2608	.10	2.65	2.47	2.20	.86	316.
2.000	2.41	2.86	.1760	.67	4.89	5.28	3.22	.91	310.
3.000	7.35	5.80	.1382	.25	6.85	10.38	5.17	.31	311.
4.000	11.05	7.64	.1620	.67	8.43	14.24	6.99	.21	311.
5.000	13.76	9.77	.1999	1.40	9.83	17.55	8.79	.31	309.
6.000	16.26	11.39	.2883	2.32	11.68	20.71	10.32	.40	307.
7.000	18.58	12.82	.3330	3.24	13.00	23.54	11.59	.41	306.
8.000	20.07	13.44	.3455	3.97	14.05	25.39	12.30	.38	302.
9.000	21.55	13.43	.3705	4.64	15.37	27.17	12.78	.26	300.
10.000	23.55	13.70	.3926	5.41	16.29	29.35	13.23	.19	295.
11.000	24.94	13.40	.4093	5.55	16.28	30.38	13.17	.23	278.
12.000	26.84	12.98	.3769	5.44	15.76	31.47	13.24	.42	274.
13.000	25.97	[illegible]	[illegible]	4.47	13.69	30.22	11.81	.48	255.
14.000	24.97	9.86	.3376	3.25	11.43	27.66	9.81	.17	234.
15.000	22.35	9.87	.2596	2.51	9.55	24.53	9.61	.38	213.
16.000	19.17	8.46	.1885	1.63	8.18	20.99	8.24	.25	197.
17.000	16.06	7.55	.1098	.73	6.76	17.52	7.34	.57	184.
18.000	12.73	7.11	.0851	-.08	5.92	14.22	6.72	.99	183.
19.000	9.90	6.66	.2215	-.49	4.79	11.31	6.12	1.28	177.
20.000	7.32	6.54	.3340	-.67	3.89	8.83	5.82	1.66	168.
21.000	5.59	6.63	.3688	-.77	3.43	7.51	5.58	1.89	165.
22.000	4.57	6.71	.3237	-1.11	3.62	7.31	5.16	2.04	162.
23.000	4.27	6.40	.4724	-1.26	2.93	6.81	4.78	2.18	160.
24.000	4.09	6.97	.4776	-1.34	3.25	7.36	4.82	1.91	149.
25.000	4.35	8.08	.3964	-.92	3.78	8.15	5.70	1.64	138.
26.000	5.35	8.50	.4594	-1.28	3.33	8.81	5.96	1.58	138.
27.000	7.67	9.25	.5535	-1.35	3.76	10.59	6.90	1.29	122.
28.000	10.02	9.71	.5239	-1.25	4.39	12.69	7.35	1.12	122.
29.000	12.28	9.83	.6610	-1.33	4.29	14.32	7.86	1.15	70.
30.000	15.18	18.07	.5264	-.33	8.54	20.77	12.94	.89	196.
32.000	21.89	19.65	.4869	1.02	8.12	26.90	14.40	.58	198.
34.000	31.25	20.76	.5945	3.75	9.37	35.26	16.28	.14	199.
38.000	40.09	21.32	.6074	4.54	10.21	43.12	18.07	.09	199.
38.000	46.75	20.78	.4079	4.95	11.98	49.89	17.19	-.13	200.
40.000	52.77	19.02	.4003	5.60	12.85	55.55	15.98	-.22	199.
42.000	57.20	19.47	.3551	8.24	14.06	60.31	16.66	-.74	199.
44.000	62.26	20.94	.2161	11.80	14.78	66.09	17.42	-.70	196.
46.000	67.22	22.48	.1538	14.97	15.98	71.71	18.93	-.45	196.
48.000	70.09	23.04	.1436	16.28	16.03	74.62	19.87	-.38	194.
50.000	71.49	26.20	.0875	18.05	18.64	77.18	22.61	-.47	191.
52.000	71.76	27.18	.1148	18.64	18.59	77.37	24.33	-.40	188.
54.000	71.27	26.65	.1850	18.35	18.97	76.89	24.73	-.20	184.
56.000	72.52	27.32	.1314	17.90	21.01	78.38	24.94	-.13	178.
58.000	73.42	27.19	.1065	15.60	21.38	78.83	24.76	-.09	172.
60.000	73.38	28.56	.1104	14.31	22.64	78.94	26.05	-.01	165.
62.000	74.02	27.91	.1524	9.93	21.79	78.61	25.44	-.03	152.
64.000	78.69	30.61	.2831	9.44	23.24	82.99	29.41	-.37	123.
66.000	78.51	33.03	-.0802	7.70	25.29	83.36	31.56	-.50	78.
68.000	79.57	32.94	.0731	-.84	29.90	85.30	31.86	-.06	50.
70.000	78.26	33.10	-.0345	-14.46	27.39	84.29	32.38	-.42	31.

TABLE I-13. WIND STATISTICAL PARAMETERS

ANNUAL

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
1.246	.12	2.30	-.0782	.62	3.04	2.99	2.46	1.39	4833.
2.000	1.82	3.33	.0032	1.30	4.67	5.24	3.23	1.08	4604.
3.000	4.55	5.26	.0659	.67	5.34	7.58	4.46	.77	4592.
4.000	6.65	7.38	.1750	.52	6.64	10.28	6.13	.72	4567.
5.000	8.52	9.49	.2317	.63	8.09	12.90	7.89	.78	4534.
6.000	10.46	11.04	.2634	.94	9.11	14.91	9.63	.83	4483.
7.000	12.27	12.39	.2967	1.22	10.11	16.82	11.19	.85	4445.
8.000	13.84	13.40	.3287	1.45	11.27	18.71	12.26	.84	4416.
9.000	15.35	14.08	.3225	1.66	12.20	20.44	12.96	.78	4363.
10.000	16.96	14.43	.3154	1.81	12.87	22.12	13.27	.64	4293.
11.000	18.48	14.74	.3015	1.79	12.95	23.55	13.25	.51	4163.
12.000	20.02	15.10	[illegible]	1.77	12.50	[illegible]	13.43	.50	[illegible]
13.000	20.18	14.45	.2747	1.54	11.49	24.38	12.49	.39	3994.
14.000	18.96	13.07	.2583	1.52	9.78	22.43	11.19	.26	3831.
15.000	16.43	11.89	.2354	1.34	8.62	19.55	10.27	.35	3674.
16.000	13.32	10.80	.1903	1.08	7.14	16.15	9.25	.53	3412.
17.000	9.61	9.98	.1282	.75	5.80	12.75	7.98	.82	3240.
18.000	5.93	9.46	.0876	.62	4.91	10.11	6.86	1.30	3180.
19.000	3.21	8.81	.0783	.43	3.99	8.37	5.84	1.74	3069.
20.000	1.16	8.49	.0524	.30	3.34	7.64	5.14	1.95	2982.
21.000	-.29	8.61	.0270	.23	3.12	7.68	5.00	1.81	2880.
22.000	-1.34	8.82	.0408	.17	2.97	7.87	5.15	1.61	2818.
23.000	-1.70	9.02	.0647	.15	2.59	8.01	5.19	1.27	2679.
24.000	-2.30	9.67	.0645	.17	2.93	8.87	5.38	1.02	2617.
25.000	-2.46	10.04	.0324	.20	3.00	9.24	5.53	.80	2485.
26.000	-2.05	10.67	.0614	.29	2.78	9.60	5.82	.68	2346.
27.000	-1.78	11.81	.0779	.30	3.06	10.60	6.31	.68	2120.
28.000	-.76	12.75	.0884	.29	3.24	11.34	6.73	.76	2062.
29.000	-.46	13.95	.0698	.26	3.45	12.44	7.22	.75	1439.
30.000	1.05	16.73	.2005	.92	4.78	14.86	9.16	1.00	2224.
32.000	3.61	19.32	.1970	1.80	5.51	17.34	10.94	1.03	[illegible]
34.000	6.70	22.13	.3169	1.95	6.41	20.11	13.25	1.03	2251.
36.000	[illegible]	25.69	.3516	1.42	6.62	23.35	15.43	.96	2291.
38.000	9.51	28.61	.2685	.87	7.48	26.14	16.81	.83	2300.
40.000	9.43	30.97	.2349	.88	8.22	28.24	17.88	.73	2300.
42.000	8.73	33.60	.2712	2.21	8.95	30.58	18.85	.62	2301.
44.000	9.13	36.67	.2919	4.20	9.95	33.85	19.99	.60	2292.
46.000	10.71	39.58	.3067	6.37	10.97	37.03	21.72	.62	2288.
48.000	12.12	42.04	.3012	7.89	11.83	39.94	22.88	.64	2275.
50.000	13.14	44.03	.3239	8.82	12.42	41.77	24.40	.65	2263.
52.000	13.43	46.02	.3468	8.78	12.58	43.49	25.33	.62	2232.
54.000	13.89	47.64	.3331	9.80	13.07	45.12	25.99	.57	2202.
56.000	14.18	49.06	.3326	8.38	14.19	46.78	26.33	.60	2144.
58.000	15.10	50.64	.2832	8.15	14.82	48.58	26.83	.51	2062.
60.000	17.13	52.35	.2792	7.59	15.90	50.58	28.06	.53	1943.
62.000	18.98	53.99	.1425	5.99	15.75	52.01	29.25	.46	1727.
64.000	20.73	53.95	.1179	3.46	17.39	52.12	30.66	.60	1463.
66.000	21.27	53.94	.0197	-.33	18.35	51.43	32.50	.64	1106.
68.000	21.61	51.97	-.0380	-5.31	20.68	50.18	33.33	.85	771.
70.000	23.23	47.39	-.0816	-3.87	23.47	48.94	32.36	.96	516.

TABLE II-1. THERMODYNAMIC STATISTICAL PARAMETERS

JANUARY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1021.6000	9.0775	-.24	280.46	10.64	.27	1268.0000	58.9000	-.11	329.	329.	329.
1.000	903.8300	5.3868	-.11	277.81	7.47	.15	1132.0000	35.4300	-.04	329.	329.	329.
1.246	876.9900	4.8966	-.04	276.95	6.77	.10	1102.0000	30.8800	-.01	348.	348.	348.
2.000	800.3300	4.1375	-.04	277.70	5.21	-.98	1003.0000	20.1900	.89	348.	348.	348.
3.000	707.1200	4.1898	-.26	272.66	5.00	-.85	902.6000	14.4900	.90	347.	347.	347.
4.000	623.2300	4.6670	-.45	267.32	4.71	-.41	811.7000	10.4100	.32	345.	345.	345.
5.000	547.8600	5.1809	-.51	261.09	4.54	-.31	730.7000	8.0810	.15	340.	340.	340.
6.000	479.9700	5.4018	-.51	254.16	4.38	-.30	657.7000	6.4520	.12	330.	330.	330.
7.000	418.9100	5.5981	-.51	246.71	4.33	-.29	591.4000	5.3440	.00	322.	322.	322.
8.000	364.2800	5.6206	-.45	239.23	4.21	-.15	530.4000	4.8300	-.49	316.	316	316.
9.000	315.2500	5.4136	-.35	231.76	3.79	.01	473.9000	4.9990	-.93	308.	308.	308.
10.000	271.5200	5.1199	-.27	224.80	3.24	.01	420.8000	6.3920	-1.30	295.	295.	295.
11.000	232.9700	4.6069	-.14	219.39	3.16	.32	370.0000	8.5270	-1.04	282.	282.	282.
12.000	199.3400	3.6939	-.04	[illegible]	[illegible]	.47	322.5000	10.4400	-.52	277	277	277.
13.000	170.1300	3.1878	.05	213.97	4.99	-.05	277.2000	9.6650	.24	267.	267.	267.
14.000	145.0000	2.5366	.02	212.47	4.03	-.35	237.9000	7.3000	.49	253.	253.	253.
15.000	123.5600	1.9738	-.05	210.13	3.58	-.33	204.9000	5.8340	.29	235.	235.	235.
16.000	104.9200	1.4986	-.03	207.78	3.72	-.42	176.0000	4.9280	.38	227.	227.	227.
17.000	89.0630	1.1608	-.01	206.75	3.89	-.33	150.1000	4.0830	.36	212.	212.	212.
18.000	75.5600	.9119	-.01	206.79	4.12	-.23	127.4000	3.3270	.36	204.	204.	204.
19.000	64.1560	.7454	.00	207.88	3.68	-.36	107.5000	2.2840	.29	200.	200.	200.
20.000	54.5130	.6530	.08	209.26	3.31	-.41	90.7700	1.5870	.29	189.	189.	189.
21.000	46.3930	.5853	.02	210.75	3.16	-.36	76.7000	1.1760	.29	178.	178.	178.
22.000	39.5330	.5402	.08	212.42	3.13	-.28	64.8400	.9756	.20	165.	165.	165.
23.000	33.7240	.5007	.08	213.82	3.10	-.19	54.9500	.7793	-.27	162.	162.	162.
24.000	28.7980	.4565	.19	215.26	3.37	.04	46.6100	.7005	-.48	149.	149.	149.
25.000	24.6370	.4205	.07	217.02	3.28	.26	39.5500	.6050	-.10	137.	137.	137.
26.000	21.0960	.3803	.12	218.50	3.08	.52	33.6400	.5110	.24	134.	134.	134.
27.000	18.0910	.3485	.09	220.08	3.30	.68	28.6400	.4789	.25	119.	119.	119.
28.000	15.5300	.3069	.23	221.62	3.72	.68	24.4100	.4502	.09	117.	117.	117.
29.000	13.3010	.2774	.50	222.90	3.08	-.01	20.7900	.4046	.42	73.	73.	73.
30.000	11.6020	.2579	.01	226.70	4.88	.18	17.9000	.4807	-.41	166.	174.	150.
32.000	8.6336	.1995	-.27	229.79	5.31	.02	13.1100	.3373	-.09	159.	167.	154.
34.000	6.4485	.1636	-.26	234.28	5.90	.48	9.5960	.2889	-.57	160.	168.	155.
36.000	[illegible]	[illegible]	-.05	[illegible]	[illegible]	.59	7.0490	.2428	-.23	157.	165.	156.
38.000	3.6772	.1108	-.01	246.21	7.67	.68	5.2070	.1866	-.21	156.	164.	156.
40.000	2.8050	.0943	.30	252.62	8.60	.34	3.8720	.1446	-.29	156.	164.	156.
42.000	2.1556	.0826	.58	258.78	8.17	.28	2.9030	.1085	-.23	155.	164.	155.
44.000	1.6666	.0698	.73	264.41	8.37	.20	2.1940	.0911	-.38	155.	157.	155.
46.000	1.2941	.0583	.85	267.40	7.55	.49	1.6840	.0696	-.17	153.	153.	153.
48.000	1.0066	.0482	.91	267.75	5.94	.01	1.3080	.0557	.52	153.	156.	153.
50.000	.7830	.0396	.91	265.62	5.26	.28	1.0250	.0459	.62	152.	155.	152.
52.000	.6071	.0322	.91	261.53	5.75	-.07	.8081	.0395	.72	150.	160.	150.
54.000	.4685	.0260	.96	258.34	5.80	-.04	.6317	.0316	.71	148.	158.	148.
56.000	.3606	.0213	.97	255.17	5.94	-.05	.4920	.0265	.76	141.	148.	141.
58.000	.2772	.0174	.96	253.09	7.27	.26	.3817	.0222	.59	132.	139.	132.
60.000	.2125	.0145	.89	250.84	8.60	.30	.2954	.0182	.73	118.	123.	118.
62.000	.1619	.0117	.74	247.98	10.12	.31	.2276	.0134	.59	92.	97.	92.
64.000	.1235	.0096	.47	245.12	11.46	-.03	.1756	.0106	.40	67.	72.	67.
66.000	.0933	.0074	-.16	243.18	13.52	-.48	.1339	.0073	-.06	47.	51.	47.
68.000	.0701	.0066	-.24	241.19	15.74	-.40	.1014	.0058	-.14	35.	39.	35.
70.000	.0516	.0063	.11	234.11	16.17	-.24	.0771	.0056	-.06	23.	26.	23.

TABLE II-2. THERMODYNAMIC STATISTICAL PARAMETERS

FEBRUARY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1018.5000	8.3482	.00	294.27	10.07	.25	1247.0000	53.0600	-.08	379.	379.	379.
1.000	902.3600	5.3917	-.05	279.94	7.17	.40	1122.0000	32.1100	-.19	379.	379.	379.
1.24E	875.4500	5.0085	-.08	278.85	6.51	.44	1092.0000	27.9000	-.22	386.	386.	386.
2.000	799.0200	4.5622	-.17	277.47	4.89	-.20	1002.0000	17.9500	.32	385.	385.	385.
3.000	705.7000	4.6239	-.19	271.30	4.60	-.40	905.3000	12.8C00	.43	384.	384.	384.
4.000	621.5800	5.0515	-.29	265.34	4.44	-.61	815.6000	9.4580	.53	381.	381.	381.
5.000	545.9300	5.5387	-.43	258.98	4.55	-.84	734.1000	7.7700	.64	370.	370.	370.
6.000	477.7600	5.7772	-.51	252.00	4.63	-.94	660.3000	6.6340	.47	367.	367.	367.
7.000	416.6500	5.7696	-.56	244.08	4.19	-.72	592.7000	5.1340	-.25	359.	359.	359.
8.000	361.8600	5.7243	-.57	237.64	3.86	-.41	530.4000	5.5130	-.80	355.	355.	355.
9.000	312.8800	5.4096	-.48	230.65	3.37	.14	472.6000	6.7550	-1.00	347.	347.	347.
10.000	[illegible]	[illegible]	-.32	[illegible]	3.37	.68	418.1000	8.8720	-1.03	338.	338.	338.
11.000	231.1500	4.1844	-.07	220.17	4.07	.72	365.9000	10.2600	-.72	326.	326.	326.
12.000	197.9100	3.5307	.21	217.63	5.46	-.06	317.0000	10.8200	-.10	309.	309.	309.
13.000	169.1500	2.9085	.52	216.45	4.91	-.68	272.4000	8.4520	.31	296.	296.	296.
14.000	144.3900	2.4165	.66	214.24	3.64	-.58	234.9000	6.2040	.30	279.	279.	279.
15.000	123.1100	2.0170	.63	211.64	3.20	-.21	202.7000	5.3420	.54	263.	263.	263.
16.000	104.6100	1.4787	.51	209.26	3.18	.04	174.2000	4.3810	.38	252.	252.	252.
17.000	88.9130	1.1546	.55	208.01	3.24	.02	149.0000	3.5930	.54	241.	241.	241.
18.000	75.5180	.9186	.38	207.89	3.27	-.10	126.6000	2.8240	.67	231.	231.	231.
19.000	64.1730	.7673	.26	208.95	3.09	-.14	107.0000	2.0810	.61	231.	231.	231.
20.000	54.5850	.6602	.25	210.50	2.71	-.14	90.3500	1.4170	.21	228.	228.	228.
21.000	46.4920	.6004	.26	212.03	2.62	-.05	76.3900	1.1020	.04	218.	218.	218.
22.000	39.6470	.5552	.26	213.60	2.90	.14	64.6700	.9352	-.26	206.	206.	206.
23.000	33.8520	.5038	.31	215.03	2.68	.15	54.8500	.7617	-.48	203.	203.	203.
24.000	28.9240	.4680	.43	216.56	2.83	.14	46.5300	.7244	-.42	192.	192.	192.
25.000	24.7650	.4288	.40	218.22	2.89	-.05	39.5400	.6808	-.38	181.	181.	181.
26.000	21.2100	.3819	.42	219.75	3.13	.07	33.6300	.6008	-.19	177.	177.	177.
27.000	18.1850	.3449	.33	221.42	3.15	.19	28.6100	.5135	.11	158.	158.	158.
28.000	15.6220	.3079	.34	223.16	3.28	.45	24.3900	.4385	.20	156.	156.	156.
29.000	13.4470	.2747	.23	224.90	3.14	.50	20.8300	.3765	.24	114.	114.	114.
30.000	11.5960	.2409	-.36	227.07	4.76	-.08	17.8000	.4306	-.30	156.	163.	152.
32.000	8.6419	.1971	-.48	232.98	5.88	.16	12.9300	.3885	-.25	155.	163.	154.
34.000	6.4883	.1592	-.38	238.59	6.57	-.08	9.4810	.3076	-.18	154.	162.	[illegible]
36.000	4.9065	.1336	-.18	245.11	6.99	-.13	6.9740	.2316	-.44	154.	161.	154.
38.000	3.7385	.1114	.05	251.35	8.39	.13	5.1840	.1848	-.41	154.	161.	154.
40.000	2.3667	.0978	.13	256.56	8.96	.01	3.8940	.1325	-.60	154.	162.	154.
42.000	2.2108	.0653	.15	261.78	8.48	-.27	2.9400	.0945	.02	154.	160.	154.
44.000	1.7122	.0740	.05	264.83	8.83	-.23	2.2490	.0813	.17	154.	157.	154.
46.000	1.3300	.0613	.00	266.18	6.20	.43	1.7380	.0711	.15	154.	156.	154.
48.000	1.0317	.0501	.00	265.81	5.73	.38	1.3510	.0589	.26	151.	153.	151.
50.000	.8016	.0404	.00	264.18	6.12	.19	1.0570	.0471	-.03	150.	154.	150.
52.000	.6213	.0332	.07	262.37	6.59	.14	.8248	.0385	-.25	149.	153.	149.
54.000	.4805	.0274	.19	260.02	6.27	.27	.6441	.0325	-.37	147.	154.	147.
56.000	.3706	.0225	.35	257.68	6.82	-.20	.5009	.0268	-.35	144.	149.	144.
58.000	.2856	.0178	.48	255.87	7.18	-.18	.3889	.0205	-.03	135.	143.	135.
60.000	.2195	.0142	.19	253.91	7.34	-.23	.3011	.0167	-.10	126.	134.	126.
62.000	.1700	.0116	.10	251.70	7.91	-.33	.2353	.0131	.04	95.	103.	95.
64.000	.1315	.0097	-.02	249.46	8.35	-.64	.1835	.0102	.16	71.	79.	71.
66.000	.1019	.0066	-.20	247.05	7.24	-.36	.1432	.0079	.09	43.	51.	43.
68.000	.0771	.0044	-.01	242.69	8.23	-1.44	.1113	.0077	.77	25.	31.	25.
70.000	.0580	.0028	-.89	238.44	7.31	-1.26	.0852	.0045	-.50	17.	21.	17.

TABLE II-3. THERMODYNAMIC STATISTICAL PARAMETERS

MARCH

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1015.2000	7.9447	.03	287.77	9.98	.24	1227.0000	51.1300	.02	396.	396.	396.
1.000	900.6700	5.1524	-.19	282.73	7.33	.37	1108.0000	31.7400	-.09	396.	396.	396.
1.246	874.1100	4.8017	-.24	281.69	6.91	.38	1080.0000	28.3800	-.10	411.	411.	411.
2.000	798.3900	4.5659	-.47	279.64	5.79	-.01	993.4000	19.9400	.13	411.	411.	411.
3.000	705.7100	4.8917	-.52	272.75	5.47	-.24	900.5000	14.6700	.28	411.	411.	411.
4.000	621.8400	5.5563	-.48	266.00	5.10	-.46	813.9000	10.2200	.51	411.	411.	411.
5.000	546.2900	6.1532	-.54	259.30	4.89	-.59	733.6000	7.5340	.47	408.	408.	408.
6.000	478.1200	6.4478	-.55	252.35	4.71	-.62	659.9000	5.8830	.21	406.	406.	406.
7.000	416.9500	6.5417	-.55	245.10	4.59	-.49	592.5000	5.0870	-.58	403.	403.	403.
8.000	362.4000	6.3429	-.46	237.93	4.32	-.33	530.6000	4.9960	-.91	393.	393.	393.
9.000	313.4800	6.0275	-.40	230.90	3.78	.03	472.9000	5.5720	-.91	383.	383.	383.
10.000	269.9700	5.6001	-.34	224.46	3.35	.35	419.0000	7.7870	-.98	372.	372.	372.
11.000	231.6700	4.9206	-.25	219.63	3.57	.63	367.6000	9.9560	-.76	354.	354.	354.
12.000	196.0000	4.1212	-.10	215.20	4.96	.31	319.6000	11.3600	-.34	351.	351.	351.
13.000	169.2800	3.3642	-.06	215.10	4.57	-.21	274.3000	9.5940	.13	338.	338.	338.
14.000	144.4400	2.6268	-.10	213.80	3.48	-.12	235.5000	7.0270	.05	324.	324.	324.
15.000	123.2200	2.0319	-.14	211.69	3.30	.00	202.9000	5.8130	.06	307.	307.	307.
16.000	104.8800	1.5716	-.16	210.11	3.39	-.09	174.0000	4.7590	.11	306.	306.	306.
17.000	89.1930	1.2165	-.19	209.42	3.53	-.06	148.4000	3.8780	.19	290.	290.	290.
18.000	75.8250	.9437	-.33	209.40	3.56	-.09	126.2000	3.0620	.12	284.	284.	284.
19.000	64.4930	.7516	-.45	210.35	3.14	-.10	106.8000	2.2380	-.03	274.	274.	274.
20.000	54.9220	.6160	-.41	211.82	2.61	.03	90.3400	1.5560	-.18	267.	267.	267.
21.000	46.8500	.5290	-.34	213.55	2.61	.24	76.4400	1.2130	-.31	256.	256.	256.
22.000	40.0100	.4550	-.12	215.20	2.82	.30	64.7800	1.0040	-.41	244.	244.	244.
23.000	34.2110	.4128	.02	216.86	2.79	.49	54.9600	.7755	-.46	237.	237.	237.
24.000	29.2710	.3803	.09	218.57	3.12	.57	46.6600	.6624	-.58	226.	226.	226.
25.000	25.0940	.3541	.15	220.26	3.30	.43	39.6900	.5776	-.51	218.	218.	218.
26.000	21.5320	.3383	.18	221.81	3.62	.18	33.8200	.4669	-.20	204.	204.	204.
27.000	18.4960	.3202	.18	223.50	3.72	.14	28.8300	.3916	.01	181.	181.	181.
28.000	15.9060	.3070	.22	225.28	4.01	.27	24.6000	.3429	-.06	181.	181.	181.
29.000	13.7240	.2809	.43	227.50	4.11	.37	21.0200	.2931	-.01	136.	136.	136.
30.000	11.7970	.2247	.15	228.96	4.21	.67	17.9700	.3754	-.41	126.	132.	124.
32.000	8.8024	.1883	.38	234.38	4.98	.62	13.1000	.3134	.06	126.	133.	122.
34.000	6.6166	.1619	.59	239.89	5.91	.62	9.6170	.2633	.02	127.	134.	127.
36.000	5.0067	.1371	.79	244.95	5.94	.19	7.1240	.2025	-.02	127.	134.	127.
38.000	3.8121	.1141	.88	249.96	6.09	-.20	5.3180	.1615	.07	127.	134.	127.
40.000	2.9174	.0966	.84	254.97	6.17	.27	3.9890	.1148	.56	127.	135.	127.
42.000	2.2453	.0812	.77	260.10	6.12	.06	3.0090	.1010	.65	127.	134.	127.
44.000	1.7355	.0667	.67	262.98	5.65	-.33	2.2990	.0833	.64	127.	133.	127.
46.000	1.3448	.0541	.54	264.79	5.21	-.02	1.7700	.0700	.80	127.	132.	127.
48.000	1.0430	.0437	.52	266.08	5.05	-.07	1.3660	.0550	.32	126.	131.	126.
50.000	.8104	.0352	.52	266.30	5.11	-.33	1.0610	.0427	.18	126.	133.	126.
52.000	.6293	.0286	.51	265.30	4.97	-.16	.8267	.0348	.36	126.	131.	126.
54.000	.4882	.0231	.51	263.33	5.09	-.20	.6463	.0275	.37	128.	133.	126.
56.000	.3774	.0183	.41	261.50	5.77	.37	.5029	.0221	.25	122.	128.	122.
58.000	.2919	.0150	.43	259.66	6.05	.20	.3920	.0177	.24	115.	123.	115.
60.000	.2246	.0124	.41	255.77	6.36	-.06	.3062	.0142	.34	107.	114.	107.
62.000	.1718	.0094	.42	251.39	6.23	-.02	.2381	.0099	.44	92.	97.	92.
64.000	.1316	.0077	.28	248.23	7.25	.15	.1844	.0081	.30	71.	76.	71.
66.000	.1004	.0065	-.02	246.20	9.23	-.05	.1418	.0064	-.29	52.	56.	52.
68.000	.0769	.0053	-.21	243.06	12.30	-.70	.1103	.0037	-.15	38.	39.	38.
70.000	.0575	.0045	-.36	235.35	11.90	-.22	.0851	.0039	-.37	30.	31.	30.

TABLE II-4. THERMODYNAMIC STATISTICAL PARAMETERS

APRIL

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1011.0000	7.1256	.40	295.24	9.42	.19	1191.0000	45.0200	.04	399.	399.	399.
1.000	899.5000	4.8052	.50	289.02	6.71	.27	1082.0000	27.5800	-.01	399.	399.	399.
1.246	873.4700	4.4729	.49	287.62	6.11	.24	1056.0000	24.0500	.01	429.	429.	429.
2.000	799.0900	4.1222	.26	284.57	4.20	-.44	976.6000	14.8600	.62	425.	425.	425.
3.000	707.6600	4.0973	.03	276.67	3.91	-.40	889.9000	10.8700	.43	422.	422.	422.
4.000	624.6900	4.2517	-.14	269.54	3.50	-.54	806.7000	7.8000	.53	412.	412.	412.
5.000	549.7600	4.4408	-.30	262.68	3.37	-.66	728.6000	6.4670	.28	408.	408.	408.
6.000	481.9900	4.5446	-.36	255.72	3.22	-.80	656.4000	5.1510	.22	406.	406.	406.
7.000	421.0200	4.5254	-.43	248.48	3.08	-.73	590.1000	4.6280	.13	403.	403.	403.
8.000	366.4400	4.3722	-.45	241.21	2.88	-.48	529.1000	4.7730	-.31	401.	401.	401.
9.000	317.4800	4.1436	-.40	233.96	2.67	-.24	472.7000	5.1980	-.78	401.	401.	401.
10.000	273.7700	3.8436	-.23	226.87	2.41	-.06	420.4000	5.7450	-1.04	398.	398.	398.
11.000	235.1000	3.3617	-.06	220.57	2.50	.58	371.4000	6.8050	-1.03	362.	362.	362.
12.000	201.2600	2.7823	.05	215.45	3.74	.82	325.5000	7.9790	-.75	380.	380.	380.
13.000	171.7800	2.2483	.19	213.96	4.15	.01	279.8000	7.5150	.20	359.	359.	359.
14.000	146.5200	1.7826	.24	213.52	3.15	-.31	239.1000	5.1790	.42	351.	351.	351.
15.000	124.9300	1.4532	.24	212.07	2.91	-.09	205.3000	4.2020	.20	336.	336.	336.
16.000	106.3000	1.1427	.21	210.76	2.95	-.08	175.8000	3.4960	.16	316.	316.	316.
17.000	90.4130	.8927	.22	209.92	2.90	-.22	150.1000	2.8140	.21	286.	286.	286.
18.000	76.8920	.7226	.22	209.72	2.94	-.17	127.8000	2.2790	.19	281.	281.	281.
19.000	65.4400	.6099	.27	210.62	2.57	-.26	108.3000	1.7390	.11	266.	266.	266.
20.000	55.7610	.5280	.29	212.51	2.62	-.28	91.4200	1.3830	.23	257.	257.	257.
21.000	47.5820	.4688	.28	214.34	2.73	-.36	77.3500	1.0800	.25	246.	246.	246.
22.000	40.6480	.4272	.30	216.16	2.82	-.38	65.5200	.8373	.36	245.	245.	245.
23.000	34.7880	.3936	.24	217.91	2.68	-.53	55.6200	.6154	.44	225.	225.	225.
24.000	29.7950	.3651	.20	219.63	2.76	-.43	47.2600	.5171	.28	220.	220.	220.
25.000	25.5470	.3383	.04	221.10	2.73	-.38	40.2500	.4325	.06	215.	215.	215.
26.000	21.9270	.3165	-.01	222.50	2.65	-.42	34.3300	.3719	.27	206.	206.	206.
27.000	18.8400	.2825	-.09	224.32	2.61	-.40	29.2600	.3301	.15	188.	188.	188.
28.000	16.2150	.2642	-.16	226.43	2.62	-.48	24.9500	.3040	-.03	188.	188.	188.
29.000	13.9590	.2490	.05	228.18	2.71	-.20	21.3100	.2775	.11	121.	121.	121.
30.000	12.0810	.2380	.38	230.54	4.10	.10	18.2700	.3167	.49	128.	134.	125.
32.000	9.0434	.2034	.31	235.78	4.02	-.25	13.3700	.2711	.11	125.	132.	125.
34.000	6.6123	.1633	.29	241.56	4.46	.44	9.6270	.2253	.10	127.	134.	127.
36.000	5.1620	.1398	.26	246.40	4.33	.19	7.1020	.1928	.12	127.	134.	127.
38.000	3.9359	.1116	.29	251.32	4.31	-.06	5.4590	.1562	-.01	127.	134.	127.
40.000	3.0153	.0885	.43	257.06	4.69	.15	4.0880	.1248	.00	127.	134.	127.
42.000	2.3278	.0714	.47	262.18	4.96	-.20	3.0920	.1063	.00	126.	130.	126.
44.000	1.8048	.0571	.59	266.56	4.74	.37	2.3570	.0745	.16	126.	126.	126.
46.000	1.4041	.0466	.63	269.14	4.39	.37	1.8150	.0555	.62	126.	121.	126.
48.000	1.0941	.0384	.52	270.67	3.82	.21	1.4030	.0484	.55	125.	121.	125.
50.000	.8538	.0304	.63	269.69	3.45	-.01	1.1020	.0359	.48	124.	122.	124.
52.000	.6646	.0246	.70	268.14	3.69	-.09	.8629	.0294	.59	120.	124.	120.
54.000	.5169	.0200	.70	265.88	4.31	-.42	.6770	.0233	.62	119.	124.	119.
56.000	.4009	.0164	.70	262.52	4.10	-.20	.5318	.0193	.70	115.	121.	115.
58.000	.3105	.0136	.61	259.83	4.70	-.33	.4166	.0169	1.18	106.	112.	106.
60.000	.2394	.0113	.67	256.49	5.04	-.14	.3252	.0131	.19	99.	105.	99.
62.000	.1839	.0093	.66	253.09	6.26	.76	.2531	.0102	-.19	85.	91.	85.
64.000	.1406	.0065	.35	248.27	6.92	.05	.1974	.0066	.02	65.	70.	65.
66.000	.1075	.0042	.11	244.49	8.16	-.11	.1531	.0045	-.49	37.	42.	37.
68.000	.0813	.0037	.06	239.35	11.13	-.11	.1183	.0041	-.64	29.	32.	29.
70.000	.0619	.0031	-.62	234.50	12.65	.34	.0918	.0035	-1.11	18.	20.	18.

TABLE II-5. THERMODYNAMIC STATISTICAL PARAMETERS

MAY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1008.0000	5.9373	.42	302.50	9.61	.15	1157.0000	43.0400	.02	455.	455.	455.
1.000	899.2700	3.7616	.45	295.70	7.04	.16	1057.0000	27.0000	.03	455.	455.	455.
1.246	873.8000	3.5139	.33	294.04	6.53	.14	1033.0000	24.0400	.06	487.	487.	487.
2.000	800.9300	3.2525	-.15	290.35	4.29	-.44	958.7000	14.4300	.62	486.	486.	486.
3.000	711.0200	3.3734	-.45	282.15	3.94	-.49	876.3000	10.6900	.66	485.	485.	485.
4.000	629.1000	3.6682	-.57	274.09	3.48	-.66	798.5000	7.4830	.81	482.	482.	482.
5.000	554.7600	3.8634	-.60	266.38	3.01	-.67	724.8000	5.3200	.38	481.	481.	481.
6.000	487.2900	4.0493	-.61	259.11	2.90	-.39	654.8000	4.3480	-.32	475.	475.	475.
7.000	426.4200	4.0360	-.60	251.78	2.85	-.47	589.8000	3.5550	-.07	472.	472.	472.
8.000	371.7300	3.9870	-.58	244.28	2.84	-.21	530.0000	3.3570	-.56	472.	472.	472.
9.000	322.5000	3.9357	-.56	236.67	2.81	.03	474.7000	3.4100	-.92	465.	465.	465.
10.000	278.6500	3.7861	-.44	229.14	2.71	.07	423.7000	3.7940	-1.48	458.	458.	458.
11.000	239.7000	3.5654	-.33	222.16	2.55	.27	375.9000	4.6070	-1.61	449.	449.	449.
12.000	205.3200	3.1346	-.22	[illegible]	[illegible]	.52	330.7000	5.5730	-1.24	447	447	447.
13.000	175.3300	2.7314	-.11	213.27	3.46	.53	286.5000	6.8970	-.53	431.	431.	431.
14.000	149.5100	2.2715	-.06	212.57	3.49	-.07	245.1000	6.0530	.00	406.	406.	406.
15.000	127.4100	1.8320	.04	211.45	3.03	.01	210.0000	4.6460	-.13	393.	393.	393.
16.000	108.3900	1.5038	.08	210.03	2.91	-.13	179.8000	4.0540	-.17	343.	343.	343.
17.000	92.1560	1.2152	.18	209.03	2.67	-.13	153.6000	3.3100	-.04	316.	316.	316.
18.000	78.3290	.9849	.21	208.94	2.55	-.04	130.6000	2.6970	.29	305.	305.	305.
19.000	66.6170	.7798	.14	210.69	2.26	-.18	110.2000	2.0470	.49	296.	296.	298.
20.000	56.7700	.6303	.04	213.06	2.11	-.33	92.8300	1.5610	.44	288.	288.	288.
21.000	48.4580	.5143	-.02	215.37	2.12	-.26	78.3900	1.1770	.41	276.	276.	276.
22.000	41.4300	.4452	-.05	217.22	2.07	-.25	66.4500	.8994	.20	276.	276.	276.
23.000	35.4880	.3855	-.07	219.08	1.98	-.42	56.4300	.6844	.20	262.	262.	262.
24.000	30.4120	.3448	-.05	220.93	2.08	-.61	47.9600	.5638	.17	262.	262.	262.
25.000	26.1060	.3149	-.04	222.73	2.11	-.81	40.8300	.4728	.05	246.	246.	246.
26.000	22.4470	.2831	-.13	224.58	2.05	-.58	34.8200	.3765	-.09	230.	230.	230.
27.000	19.3080	.2631	-.15	226.33	2.19	-.21	29.7200	.3274	-.02	192.	192.	192.
28.000	16.6420	.2424	-.21	228.19	2.18	-.10	25.4100	.2901	-.01	192.	192.	192.
29.000	14.3580	.2177	-.38	229.99	2.26	.29	21.7500	.2585	-.11	124.	124.	124.
30.000	12.3430	.2435	-.14	231.75	2.79	.50	18.5700	.3689	-.43	136.	144.	133.
32.000	9.2454	.1924	-.04	236.36	3.24	.73	13.6300	.2644	-.34	136.	145.	135.
34.000	6.9655	.1550	.02	241.19	2.78	.47	10.0600	.2080	-.21	138.	147.	138.
36.000	5.2772	.1275	.05	245.92	3.50	.95	7.4820	.1580	.20	138.	148.	138.
38.000	4.0241	.1009	.16	251.90	3.56	.18	5.5660	.1390	.05	138.	149.	138.
40.000	3.0877	.0815	.25	257.83	3.68	1.06	4.1710	.1035	.22	138.	149.	138.
42.000	2.3850	.0648	.41	263.52	3.38	.12	3.1520	.0872	-.19	138.	149.	138.
44.000	1.8516	.0514	.52	268.08	3.11	.18	2.4050	.0670	.35	138.	145.	138.
46.000	1.4426	.0414	.54	270.75	3.67	-.04	1.8560	.0527	.57	138.	137.	138.
48.000	[illegible]	.0335	.58	271.51	4.06	.14	1.4440	.0387	.53	138.	133.	138.
50.000	.8788	.0279	.67	271.17	4.70	-.48	1.1300	.0317	.75	138.	136.	138.
52.000	.6853	.0232	.76	269.81	3.72	.43	.8847	.0245	.19	136.	142.	136.
54.000	.5333	.0191	.84	266.54	3.62	.65	.6970	.0206	.40	135.	141.	135.
56.000	.4143	.0155	1.03	263.41	3.95	.50	.5481	.0169	.48	133.	142.	133.
58.000	.3204	.0130	.93	259.75	4.13	.41	.4299	.0147	.59	128.	138.	128.
60.000	.2471	.0104	1.29	255.52	5.12	.70	.3373	.0111	.87	115.	125.	115.
62.000	.1897	.0089	1.32	250.87	5.54	.52	.2636	.0095	.78	104.	113.	104.
64.000	.1445	.0077	1.57	244.48	6.33	.42	.2059	.0083	.87	80.	84.	80.
66.000	.1092	.0064	2.03	238.21	7.58	.41	.1596	.0070	1.07	59.	61.	59.
68.000	.0824	.0055	1.82	230.97	11.36	.33	.1242	.0059	1.16	45.	47.	45.
70.000	.0611	.0037	.69	221.93	13.27	.58	.0958	.0026	-.42	25.	26.	25.

TABLE II-6. THERMODYNAMIC STATISTICAL PARAMETERS

JUNE

STATION • 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1006.3000	5.3531	-.10	305.33	8.00	.26	1143.0000	35.1100	-.10	380.	380.	380.
1.000	898.8200	3.5365	.07	299.01	5.74	.21	1043.0000	21.7400	-.05	380.	380.	380.
1.246	873.7000	3.3081	.11	297.50	5.26	.21	1019.0000	19.2100	-.04	385.	387.	385.
2.000	801.7900	3.0142	-.09	294.33	3.43	-.03	945.9000	11.5400	.30	386.	386.	386.
3.000	713.0300	2.8982	-.23	285.44	3.15	-.14	865.0000	8.8480	.38	387.	387.	387.
4.000	632.1400	2.9805	-.22	278.45	2.72	-.11	789.3000	6.4070	.28	387.	387.	387.
5.000	558.5300	3.0056	-.16	270.58	2.40	-.12	718.1000	5.0630	-.31	387.	387.	387.
6.000	491.7300	3.0717	-.11	263.36	2.49	.07	649.8000	4.9640	-.78	386.	386.	386.
7.000	431.3200	3.0508	-.11	255.56	2.70	.02	585.3000	4.4890	-.56	386.	386.	386.
8.000	376.9700	3.0833	-.09	249.38	2.83	-.03	526.4000	3.7510	-.51	384.	384.	384.
9.000	328.0700	3.1557	-.11	241.78	2.90	-.10	472.6000	3.2260	-.44	383.	383.	383.
10.000	284.3500	3.1982	-.14	234.13	2.91	-.24	423.0000	2.8640	-.36	374.	374.	374.
11.000	245.3700	3.1935	-.17	226.73	2.69	-.32	377.0000	2.9130	-.25	365.	365.	365.
12.000	210.6200	2.9730	-.21	220.05	2.85	-.52	333.4000	3.4250	-.62	363.	363.	363.
13.000	180.2800	2.7543	-.25	214.78	2.62	-.30	292.4000	4.5790	-.62	358.	358.	358.
14.000	153.7300	2.3185	-.23	211.06	2.60	.38	253.8000	5.5480	-.43	344.	344.	344.
15.000	130.6900	1.8724	-.13	208.14	3.04	.36	218.8000	5.5960	-.29	333.	333.	333.
16.000	110.9400	1.3869	-.20	206.43	3.05	.25	187.3000	4.6510	-.29	307.	307.	307.
17.000	94.1300	1.0302	-.13	206.27	2.86	.31	159.0000	3.5260	-.31	301.	301.	301.
18.000	79.8850	.7941	.05	208.19	2.64	.09	133.7000	2.4640	-.18	300.	300.	300.
19.000	67.9530	.6338	.06	211.14	1.87	.22	112.1000	1.4620	-.27	280.	280.	280.
20.000	57.9290	.5301	.09	213.70	1.54	-.11	94.4400	1.0350	-.08	277.	277.	277.
21.000	49.4730	.4805	.12	216.07	1.71	-.16	79.7700	.8688	.02	269.	269.	269.
22.000	42.3200	.4217	.07	217.99	1.70	-.20	67.6300	.7041	.06	267.	267.	267.
23.000	36.2670	.3739	.00	219.94	1.53	.17	57.4500	.5455	-.08	250.	250.	250.
24.000	31.1030	.3396	.00	221.85	1.58	.05	48.8400	.4674	-.08	250.	250.	250.
25.000	26.7140	.3014	.02	223.68	1.55	.04	41.6100	.3908	-.08	235.	235.	235.
26.000	22.9750	.2798	.09	225.52	1.57	.31	35.4903	.3440	.08	224.	224.	224.
27.000	19.7830	.2602	.11	227.32	1.89	.54	30.3200	.3117	.06	204.	204.	204.
28.000	17.0410	.2219	-.05	228.81	1.72	.23	25.9500	.2828	-.05	192.	192.	192.
29.000	14.6910	.2091	.08	230.31	1.98	.37	22.2200	.2837	-.10	144.	144.	144.
30.000	12.6860	.1924	.33	232.19	2.61	.69	19.0600	.2631	.19	117.	129.	112.
32.000	9.5058	.1613	.35	236.98	2.99	.27	14.0000	.2092	-.01	118.	131.	114.
34.000	7.1559	[illegible]	[illegible]	[illegible]	3.17	.51	[illegible]	[illegible]	-.29	121.	135.	118.
36.000	5.4273	.1052	.87	246.30	3.15	.29	7.6810	.1540	-.22	118.	132.	117.
38.000	4.1392	.0843	1.07	251.80	3.93	.84	5.7340	.1222	-.46	117.	131.	117.
40.000	3.1747	.0713	1.00	257.84	3.66	.10	4.2930	.0890	.24	117.	130.	117.
42.000	2.4513	.0588	1.18	263.20	4.07	-.16	3.2460	.0704	.28	117.	130.	117.
44.000	1.9038	.0516	1.27	267.47	3.97	-.32	2.4800	.0629	1.56	117.	124.	117.
46.000	1.4809	.0405	1.08	269.90	4.11	.35	1.9100	.0488	1.14	117.	118.	117.
48.000	1.1553	.0334	.96	271.33	5.05	.13	1.4840	.0408	1.52	116.	121.	116.
50.000	.9017	.0277	.81	271.25	4.43	.00	1.1580	.0341	1.12	116.	123.	116.
52.000	.7027	.0229	.78	269.02	4.55	.28	.9098	.0275	.75	115.	119.	115.
54.000	.5472	.0189	.74	266.29	4.46	.11	.7165	.0221	.95	112.	125.	112.
56.000	.4240	.0160	.68	262.18	4.65	.25	.5629	.0190	.54	111.	119.	111.
58.000	.3278	.0125	.43	258.32	5.40	-.02	.4419	.0142	.25	108.	119.	108.
60.000	.2523	.0105	.55	253.84	6.40	.11	.3466	.0117	.03	100.	111.	100.
62.000	.1929	.0090	.59	248.44	6.95	.06	.2705	.0097	.04	82.	91.	82.
64.000	.1465	.0076	.74	242.73	8.37	.31	.2102	.0076	.53	70.	76.	70.
66.000	.1108	.0069	.69	236.70	9.61	-.01	.1627	.0070	.58	48.	48.	48.
68.000	.0831	.0051	.52	232.58	13.25	-.08	.1249	.0054	.20	23.	24.	23.
70.000	.0617	.0051	.33	222.16	15.64	-.04	.0968	.0044	.00	14.	14.	14.

TABLE II-7. THERMODYNAMIC STATISTICAL PARAMETERS

JULY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1009.2000	4.1583	-.25	305.98	5.90	.67	1139.0000	25.8800	-.54	351.	351.	351.
1.000	901.6800	2.6363	-.11	299.78	4.25	.59	1041.0000	16.0500	-.45	351.	351.	351.
1.246	876.5700	2.4019	-.11	298.25	3.88	.54	1017.0000	14.1200	-.39	353.	353.	353.
2.000	804.7200	1.8644	-.22	294.72	2.80	-.10	946.3000	9.6160	.06	353	353.	353.
3.000	715.9900	1.5484	-.46	287.40	2.30	.05	864.2000	6.9410	.03	354.	354.	354.
4.000	635.2400	1.4646	-.49	279.88	1.73	.26	788.2000	4.6150	-.02	352.	352.	352.
5.000	561.7700	1.4139	-.38	272.73	1.37	.11	715.9000	3.3890	.29	350.	350.	350.
6.000	495.2300	1.3966	-.20	266.32	1.49	-.01	646.8000	3.3920	.20	349.	349.	349.
7.000	435.1200	1.3870	-.12	260.30	1.47	-.07	581.8000	2.6450	-.13	349.	349.	349.
8.000	381.1400	1.3658	-.10	253.72	1.53	-.04	523.0000	2.6440	-.11	349.	349.	349.
9.000	332.5700	1.4149	-.04	246.50	1.68	.17	469.8000	2.4070	-.37	347.	347.	347.
10.000	289.0800	1.4126	-.05	238.89	1.77	.13	421.4000	2.1750	-.52	344.	344.	344.
11.000	250.2400	1.4285	-.07	230.95	1.76	.09	377.5000	1.8160	-.06	341.	341.	341.
12.000	215.1900	1.3842	.00	223.12	1.52	.26	336.0000	1.4280	-.23	339.	339.	339.
13.000	184.4300	1.2927	.17	215.71	1.38	.23	297.8000	1.7580	-.32	334.	334.	334.
14.000	157.1600	1.1963	.20	209.35	1.53	-.10	261.5000	2.2440	-.48	320.	320.	320.
15.000	133.4200	1.0408	.27	204.92	1.95	.36	226.8000	2.6840	-.15	308.	308.	308.
16.000	112.9900	.8984	.23	203.40	1.85	.33	193.5000	2.4060	.26	277.	277.	277.
17.000	95.6310	.7359	.27	204.16	1.83	.01	163.2000	2.0450	.41	265.	265.	265.
18.000	81.0660	.6167	.18	207.21	1.95	-.33	136.3000	1.7320	.50	265.	265.	265.
19.000	68.9270	.5235	.08	210.51	1.72	-.27	114.1000	1.2960	.44	255.	255.	255.
20.000	58.7400	.4493	.13	213.39	1.62	.19	95.9000	.9255	.25	248.	248.	248.
21.000	50.1600	.4015	.07	216.19	1.72	.28	80.8300	.7842	.14	245.	245.	245.
22.000	42.9260	.3620	.04	218.25	1.54	.37	68.5200	.5985	.22	238.	236.	236.
23.000	36.7920	.3231	.07	220.13	1.53	.28	58.2300	.4943	.29	224.	224.	224.
24.000	31.5590	.2953	.06	221.77	1.62	-.08	49.5800	.4314	.12	224.	224.	224.
25.000	27.0970	.2672	-.01	223.41	1.67	-.12	42.2500	.3885	.01	212.	212.	212.
26.000	23.3010	.2431	.13	225.04	1.78	.25	36.0700	.3593	.02	192.	192.	192.
27.000	20.0650	.2213	.05	226.76	1.98	.31	30.8300	.3438	.14	182.	182.	182.
28.000	17.2900	.2011	.03	228.46	1.93	.30	26.3700	.2692	.20	164.	164.	164.
29.000	14.9450	.1920	-.10	230.11	2.28	.35	22.6300	.2516	.28	116.	116.	116.
30.000	12.8120	.2129	1.54	232.29	3.90	1.75	19.2500	.3857	-.60	107.	114.	100.
32.000	9.5989	.1724	1.58	235.96	3.19	.33	14.2000	.2251	1.22	106.	113.	102.
34.000	7.2109	.1540	1.26	239.72	3.63	.40	10.4900	.2071	.41	107.	114.	104.
36.000	5.4616	.1220	1.33	244.00	4.26	.28	7.8070	.1629	.53	105.	112.	105.
38.000	4.1531	.1009	1.26	249.27	4.65	.85	5.6120	.1447	.10	105.	112.	105.
40.000	3.1768	.0855	1.03	255.09	5.08	.14	4.3420	.1191	.06	104.	110.	104.
42.000	2.4467	.0694	1.21	259.85	4.63	.69	3.2820	.0763	.91	104.	111.	104.
44.000	1.8916	.0584	1.17	264.10	4.16	.11	2.4950	.0659	1.23	104.	111.	104.
46.000	1.4683	.0482	1.04	266.94	4.27	-.19	1.9160	.0552	1.30	103.	106.	103.
48.000	1.1421	.0401	.95	268.29	4.38	.23	1.4830	.0463	.92	103.	103.	103.
50.000	.8860	.0332	.99	267.14	4.30	.66	1.1580	.0366	.74	103.	104.	103.
52.000	.6897	.0268	1.01	264.79	4.63	.31	.9080	.0326	.87	102.	107.	102.
54.000	.5345	.0213	.98	261.73	5.12	.36	.7120	.0267	.97	99.	104.	99.
56.000	.4124	.0170	.91	258.44	6.10	.36	.5568	.0199	.84	99.	105.	98.
56.000	.3177	.0143	.79	254.16	6.50	.52	.4360	.0158	.92	95.	102.	95.
60.000	.2433	.0117	.80	249.03	7.13	.21	.3405	.0135	.50	88.	93.	88.
62.000	.1852	.0099	.78	243.61	8.58	-.19	.2651	.0114	.52	76.	80.	76.
64.000	.1404	.0079	.98	238.97	10.76	-.33	.2050	.0093	.22	60.	64.	60.
66.000	.1051	.0060	.29	233.77	12.34	-.09	.1570	.0071	.69	38.	41.	38.
68.000	.0786	.0060	-.14	232.01	15.06	.16	.1185	.0067	.78	25.	26.	25.
70.000	.0578	.0057	.38	225.60	16.27	.58	.0893	.0065	.36	18.	18.	18.

TABLE II-8. THERMODYNAMIC STATISTICAL PARAMETERS

AUGUST

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1009.6000	4.2804	-.42	304.77	6.69	.67	1144.0000	29.1000	-.54	375.	375.	375.
1.000	901.6100	2.7623	-.21	298.61	4.82	.64	1045.0000	17.8200	-.53	375.	375.	375.
1.246	876.4100	2.5850	-.14	297.10	4.37	.61	1021.0000	15.4900	-.50	378.	378.	378.
2.000	804.3200	2.1728	-.06	293.72	2.81	.07	949.0000	9.5840	-.10	378.	378.	378.
3.000	715.3600	1.9289	.01	286.30	2.18	.10	866.7000	6.5230	-.07	378.	378.	378.
4.000	634.4100	1.8628	.01	278.86	1.67	-.10	790.0000	4.3130	.09	376.	376.	376.
5.000	560.7900	1.8453	-.07	272.12	1.44	-.09	716.4000	3.2800	-.15	375.	375.	375.
6.000	494.3000	1.7956	-.12	266.17	1.53	-.18	646.0000	3.4010	-.18	372.	372.	372.
7.000	434.2900	1.7683	-.19	260.13	1.57	-.32	581.0000	2.8190	.18	368.	368.	368.
8.000	380.3800	1.7471	-.23	253.47	1.71	-.41	522.4000	2.6520	.09	367.	367.	367.
9.000	331.9000	1.7830	-.35	246.29	1.82	-.45	469.2000	2.4640	.17	364.	364.	364.
10.000	289.4700	1.7605	-.41	238.7[illegible]	1.90	-.32	420.7000	2.2950	.05	362.	362.	362.
11.000	249.6900	1.7541	-.49	230.92	1.96	-.24	376.7000	2.1980	-.08	358.	358.	358.
12.000	214.7000	1.6512	-.44	223.12	1.86	.01	335.2000	2.1600	-.06	355.	355.	355.
13.000	184.0300	1.5661	-.35	215.87	1.70	.22	297.0000	2.4270	-.53	352.	352.	352.
14.000	156.8200	1.3969	-.24	209.68	1.57	.01	260.6000	2.7250	-.68	342.	342.	342.
15.000	133.1400	1.1793	-.05	205.09	1.81	.32	226.2000	3.0350	-.60	334.	334.	334.
16.000	112.8100	.9214	-.06	203.63	2.06	.18	193.0000	2.8480	-.23	311.	311.	311.
17.000	95.4930	.7335	-.02	204.68	2.33	.14	162.6000	2.4700	-.07	299.	299.	299.
18.000	80.9780	.6068	.03	207.66	2.25	-.01	135.5000	1.8660	.05	299.	299.	299.
19.000	68.8670	.5168	.11	210.82	1.98	-.05	113.8000	1.3240	.01	289.	289.	289.
20.000	58.7090	.4617	.15	213.59	1.68	.10	95.7600	.8978	.15	285.	285.	285.
21.000	50.1210	.3963	-.15	215.88	1.62	.20	80.8800	.7085	.01	281.	281.	281.
22.000	42.8810	.3648	-.12	217.75	1.48	-.06	68.6000	.5458	-.13	278.	278.	279.
23.000	36.7230	.3150	-.15	219.48	1.43	-.04	58.2900	.4422	-.06	257.	257.	257.
24.000	31.4840	.2891	-.16	221.13	1.49	-.12	49.6000	.4074	-.14	257.	257.	257.
25.000	27.0210	.2722	-.07	222.78	1.43	-.09	42.2500	.3682	.03	241.	241.	241.
26.000	23.2220	.2420	.03	224.35	1.48	.10	36.0600	.3139	.25	213.	213.	213.
27.000	19.9800	.2195	-.03	225.98	1.81	-.02	30.8000	.2965	.10	198.	198.	198.
28.000	17.2050	.1991	.01	227.51	1.65	.02	26.3400	.2476	.14	182.	182.	182.
29.000	14.8380	.1857	.15	229.16	2.00	.08	22.5600	.2367	.14	143.	143.	143.
30.000	12.6980	.2332	.12	230.36	3.35	.47	19.2200	.3633	.09	109.	113.	107.
32.000	9.4917	.1891	.14	234.41	3.11	.29	14.1100	.2789	-.14	110.	114.	108.
34.000	7.1302	.1340	.52	238.14	4.0[illegible]	.71	10.4[illegible]00	.2101	-.72	109.	112.	107.
36.000	5.3044	.1274	.68	241.90	3.85	.70	7.7590	.1772	-.60	108.	112.	108.
38.000	4.0842	.1050	.86	246.81	3.50	.36	5.7660	.1206	.18	108.	113.	108.
40.000	3.1153	.0854	1.00	252.42	4.17	-.04	4.3040	.1110	.22	107.	112.	107.
42.000	2.3937	.0709	1.01	257.22	4.58	.13	3.2430	.0903	.57	107.	112.	107.
44.000	1.8467	.0582	1.08	262.42	4.06	.20	2.4520	.0696	.56	106.	111.	106.
46.000	1.4304	.0477	1.13	264.62	4.37	.17	1.8840	.0567	.65	106.	112.	106.
48.000	1.1096	.0395	1.17	265.43	4.45	.20	1.4570	.0463	.54	104.	109.	104.
50.000	.8611	.0322	1.23	264.89	4.63	.51	1.1320	.0386	.54	104.	110.	104.
52.000	.6683	.0262	1.31	263.81	4.96	.43	.8823	.0321	.89	103.	108.	103.
54.000	.5175	.0214	1.34	261.29	4.99	.32	.6895	.0260	.77	103.	107.	103.
56.000	.3996	.0178	1.35	258.03	5.54	.30	.5397	.0201	.98	101.	107.	101.
58.000	.3075	.0150	1.28	254.78	6.49	.15	.4205	.0170	1.11	99.	105.	99.
60.000	.2360	.0127	1.16	250.35	7.03	.34	.3285	.0140	.93	95.	100.	95.
62.000	.1793	.0098	1.15	245.58	7.43	-.21	.2545	.0116	.94	84.	89.	84.
64.000	.1357	.0079	1.26	241.66	8.10	.08	.1958	.0082	.89	66.	69.	66.
66.000	.1025	.0078	.93	237.53	9.08	.46	.1509	.0085	-.16	46.	49.	46.
68.000	.0764	.0042	.54	233.12	10.83	.31	.1147	.0047	.34	26.	28.	26.
70.000	.0573	.0037	.55	229.29	13.16	.59	.0873	.0042	.48	14.	15.	14.

TABLE II-9. THERMODYNAMIC STATISTICAL PARAMETERS

SEPTEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1011.6000	5.4462	.00	299.32	7.73	.20	1168.0000	36.8900	.05	370.	370.	370.
1.000	901.8100	3.5202	-.18	294.58	5.56	.10	1061.0000	22.8200	.17	370.	370.	370.
1.246	876.2500	3.2678	-.24	293.34	5.08	.05	1035.0000	20.0200	.23	373.	373.	373.
2.000	803.4900	2.6389	-.28	291.23	3.38	-.83	957.0000	12.3800	.91	373.	373.	373.
3.000	713.8750	2.4164	-.44	284.09	2.63	-.65	872.4000	8.0710	.59	373.	373.	373.
4.000	632.4600	2.4519	-.26	276.89	1.95	-.47	793.7000	5.1450	.21	371.	371.	371.
5.000	558.5800	2.3334	-.47	270.54	1.97	-.62	718.2000	4.9350	.05	369.	363.	369.
6.000	491.8900	2.3243	-.49	264.50	2.10	-.62	647.2000	4.5340	.34	363.	363.	363.
7.000	431.7200	2.3590	-.46	257.98	2.35	-.64	592.6000	3.8890	.39	362.	362.	362.
8.000	377.5500	2.4254	-.41	250.82	2.60	-.56	524.3000	3.6080	.07	362.	362.	362.
9.000	328.9600	2.5128	-.36	243.43	2.75	-.46	470.6000	3.2430	-.21	360.	360.	360.
10.000	285.4800	2.5495	-.36	236.06	2.75	-.39	421.2000	2.9710	-.18	359.	359.	359.
11.000	246.6300	2.5834	-.35	228.83	2.51	-.33	375.6000	2.8310	-.50	355.	355.	355.
12.000	212.0000	2.3711	-.33	222.11	2.00	-.26	332.5000	2.8890	-.55	354.	354.	354.
13.000	181.6000	2.1709	-.29	215.77	1.78	.06	293.2000	3.5970	-.45	351.	351.	351.
14.000	154.8100	1.8579	-.34	210.25	1.99	.21	236.5000	4.2720	-.44	346.	346.	346.
15.000	131.5100	1.4940	-.15	205.95	2.40	.27	222.5000	4.3110	-.39	336.	336.	336.
16.000	111.4100	1.1520	.09	204.15	2.56	.30	190.2000	3.7050	-.24	310.	310.	310.
17.000	94.3530	.8948	-.04	204.50	2.67	.20	160.8000	2.9720	-.11	304.	304.	304.
18.000	79.9920	.7218	-.01	207.19	2.65	.20	134.5000	2.2000	-.12	299.	299.	299.
19.000	68.0050	.6164	.09	210.64	2.17	.11	112.5000	1.4910	.05	284.	284.	284.
20.000	57.9660	.5428	.11	213.22	1.88	-.18	94.7100	1.0650	.23	278.	278.	278.
21.000	49.4910	.4873	.12	215.32	1.56	-.12	80.0700	.8081	-.18	265.	265.	265.
22.000	42.3230	.4429	.16	217.27	1.55	.32	67.8600	.6308	-.28	265.	265.	265.
23.000	36.2400	.4013	.22	219.05	1.54	.17	57.6300	.5394	-.11	253.	253.	253.
24.000	31.0580	.3656	.22	220.76	1.71	.16	49.0100	.4966	-.08	253.	253.	253.
25.000	26.6550	.3252	.18	222.42	1.79	.60	41.7500	.4477	-.10	245.	245.	245.
26.000	22.9110	.3018	.16	224.04	1.62	.75	35.6200	.3894	.00	227.	227.	227.
27.000	19.7010	.2759	.22	225.61	2.01	.58	30.4200	.3401	.03	218.	218.	218
28.000	16.9590	.2483	.25	226.90	2.03	.53	26.0400	.2970	.11	211.	211.	211.
29.000	14.5170	.2391	.27	228.18	2.43	.49	22.3200	.2657	.14	158.	159.	158.
30.000	12.5100	.2557	.04	230.54	3.39	.65	18.9100	.3558	-.99	144.	152.	139.
32.000	9.3507	.2147	.24	233.32	3.26	.86	13.9600	.2634	-.55	142.	150.	141.
34.000	7.0072	.1780	.50	236.84	3.13	.67	10.3000	.2093	-.05	146.	154.	145.
36.000	5.2857	.1442	.61	240.79	3.51	.20	7.6470	.1769	.02	145.	153.	145.
38.000	[illegible]	.1177	.71	245.46	3.72	[illegible]	5.6030	.1430	[illegible]	[illegible]	153.	145.
40.000	3.0512	.0966	.83	251.20	3.88	.40	4.2330	.1239	.32	145.	153.	145.
42.000	2.3412	.0779	.82	256.93	4.25	-.47	3.1770	.0927	.89	145.	153.	145.
44.000	1.8058	.0637	.80	262.17	3.94	-.24	2.4010	.0752	.67	145.	153.	145.
46.000	1.3995	.0522	.76	265.36	4.50	-.07	1.8360	.0595	.77	144.	149.	144.
48.000	1.0365	.0443	.65	266.73	4.56	-.32	1.4170	.0493	.54	143.	144.	143.
50.000	.8457	.0357	.66	267.39	4.39	-.51	1.1010	.0389	.82	145.	148.	145.
52.000	.6569	.0296	.67	265.84	4.28	-.25	.8604	.0329	.52	144.	147.	144.
54.000	.5103	.0244	.65	263.79	4.73	.05	.6740	.0270	.45	140.	147.	140.
56.000	.3940	.0199	.75	261.15	5.09	.11	.5251	.0208	.55	133.	139.	133.
58.000	.3053	.0172	.79	258.42	5.49	.22	.4109	.0180	.67	131.	138.	131.
60.000	.2352	.0140	.63	254.61	6.63	.17	.3217	.0146	.48	120.	127.	120.
62.000	.1004	.0116	.70	250.12	6.87	.33	.2510	.0119	.55	109.	115.	109.
64.000	.1368	.0097	.81	244.48	8.04	.22	.1949	.0100	.72	86.	90.	86.
66.000	.1045	.0075	.67	241.85	7.91	-.04	.1505	.0075	.48	55.	55.	55.
68.000	.0794	.0068	.62	236.23	12.20	-.24	.1171	.0066	.92	40.	40.	40.
70.000	.0585	.0047	.10	228.45	12.71	-.09	.0892	.0040	.02	31.	31.	31.

TABLE II-10. THERMODYNAMIC STATISTICAL PARAMETERS

OCTOBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1014.4000	7.3350	.05	292.83	9.43	.11	1203.0000	47.6000	.12	366.	366.	366.
1.000	901.9800	4.6041	-.05	288.44	6.69	.10	1086.0000	29.0000	.11	356.	366.	366.
1.246	875.9200	4.1820	-.06	287.44	6.13	.12	1058.0000	25.4800	.09	374.	374.	374.
2.000	801.8200	3.6329	-.13	286.42	4.14	-.69	972.7000	15.3700	.60	374.	374.	374.
3.000	710.9400	3.4152	-.28	279.69	3.51	-1.05	883.7000	10.3700	.83	373.	373.	373.
4.000	628.6500	3.4065	-.49	273.35	3.01	-1.04	800.0000	7.3050	.57	371.	371.	371.
5.000	554.3000	3.5769	-.69	267.32	2.97	-.67	721.7000	6.2540	.17	369.	369.	369.
6.000	487.1700	3.6428	-.76	260.78	2.96	-.68	650.4000	5.4280	.13	365.	365.	365.
7.000	426.6600	3.6063	-.80	253.66	2.82	-.64	585.7000	4.6260	.01	363.	363.	363.
8.000	372.3500	3.5316	-.76	246.25	2.80	-.29	526.6000	4.5570	-.40	363.	363.	363.
9.000	323.4600	3.3790	-.62	238.66	2.91	-.04	472.0000	4.7830	-.82	359.	359.	359.
10.000	279.8600	3.2553	-.51	231.25	2.84	.23	421.6000	4.7000	-1.02	353.	353.	353.
11.000	241.0700	3.0230	-.37	224.43	2.72	.23	374.2000	4.8500	-.32	[illegible]	[illegible]	[illegible]
12.000	206.7700	2.6672	-.26	218.68	2.84	-.17	329.4000	5.1820	-.72	345.	345.	345.
13.000	176.8100	2.3225	-.17	214.00	2.96	-.26	287.9000	5.5640	-.32	337.	337.	337.
14.000	150.6500	1.9340	-.16	210.23	3.00	-.40	249.7000	5.3540	.00	334.	334.	334.
15.000	128.0100	1.5479	-.17	207.42	2.93	-.04	215.1000	4.6960	-.04	332.	332.	332.
16.000	108.6500	1.2055	-.28	206.11	2.96	.10	183.7000	4.0460	.00	310.	310.	310.
17.000	92.1590	.9262	-.32	206.08	2.99	.05	155.8000	3.1610	.02	299.	299.	299.
18.000	78.1960	.7495	-.27	207.50	2.95	.30	131.3000	2.2940	-.07	296.	296.	296.
19.000	66.4790	.6572	-.09	210.23	2.70	.44	110.2000	1.6630	-.11	290.	290.	290.
20.000	56.6280	.5880	-.01	212.57	2.33	.12	92.8100	1.1740	-.02	277.	277.	277.
21.000	48.3159	.5315	.05	214.37	1.99	.02	79.5200	.9030	.03	267.	267.	267.
22.000	41.2700	.4825	.09	215.86	1.91	.14	66.6000	.7404	-.29	266.	266.	266.
23.000	35.3200	.4335	.16	217.57	1.81	.19	56.5600	.6412	-.34	251.	251.	251.
24.000	30.2400	.3909	.17	219.25	1.95	.09	48.0500	.5893	-.25	246.	246.	246.
25.000	25.9290	.3536	.28	220.84	2.10	.22	40.9000	.5216	-.16	236.	236.	236.
26.000	22.2660	.3238	.25	222.19	2.17	.09	34.9100	.4413	-.12	224.	224.	224.
27.000	19.1270	.2901	.28	223.37	2.27	.02	29.8300	.3714	.00	207.	207.	207.
28.000	16.4470	.2666	. 3	224.51	2.44	.15	25.5200	.3151	.03	207.	207.	207.
29.000	14.1420	.2267	3	225.81	2.70	.33	21.8200	.2648	-.04	160.	160.	160.
30.000	12.2060	.3034	-1.11	228.45	3.47	.65	18.6300	.4475	-1.66	139.	144.	134.
32.000	9.0394	.2471	-.80	231.14	3.77	1.32	13.7100	.3359	-1.05	137.	143.	134.
34.000	6.8026	.2013	-.57	235.09	4.18	.89	10.0800	.2544	-1.22	136.	143.	136.
36.000	5.1127	.1671	-.25	238.73	4.43	.35	7.4620	.2055	-1.06	137.	144.	136.
38.000	3.8677	.1343	.09	243.70	4.61	.21	5.5270	.1500	-.91	137.	144.	137.
40.000	2.9419	.1115	.24	249.42	4.56	.04	4.1080	.1258	-.23	137.	144.	137.
42.000	2.2528	.0921	.26	255.81	4.73	-.32	3.0680	.1019	-.33	137.	144.	137.
44.000	1.7369	.0764	.35	261.71	4.48	-.23	2.3120	.0843	.05	137.	144.	137.
46.000	1.3456	.0628	.38	265.38	4.35	-.27	1.7660	.0689	.10	137.	143.	137.
48.000	1.0450	.0512	.42	266.92	4.09	-.42	1.3640	.0574	.20	136.	140.	136.
50.000	.8128	.0418	.45	268.93	4.49	-.55	1.0600	.0468	.23	136.	135.	136.
52.000	.6305	.0330	.33	265.78	4.67	-.50	.8260	.0369	.21	132.	135.	132.
54.000	.4891	.0271	.32	263.13	5.52	-.71	.6477	.0297	.30	131.	137.	131.
56.000	.3779	.0221	.31	260.03	5.80	-.32	.5065	.0240	.18	129.	135.	129.
58.000	.2919	.0184	.30	257.37	6.04	-.33	.3950	.0202	.12	122.	128.	122.
60.000	.2244	.0152	.31	254.05	6.50	-.31	.3075	.0165	.26	118.	124.	118.
62.000	.1728	.0127	.27	250.59	7.56	-.04	.2401	.0137	.15	101.	106.	101.
64.000	.1317	.0108	.31	246.54	8.24	.14	.1859	.0117	.26	78.	81.	78.
66.000	.0999	.0080	.61	243.30	8.21	-.08	.1430	.0088	.38	42.	44.	42.
68.000	.0757	.0063	.48	237.38	10.80	-.03	.1111	.0068	.51	30.	32.	30.
70.000	.0562	.0058	.81	230.48	13.69	.56	.084	.0062	.24	19.	19.	19.

TABLE II-11. THERMODYNAMIC STATISTICAL PARAMETERS

NOVEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1023.1000	8.3515	.11	284.30	9.39	-.01	1248.0000	51.1000	.21	379.	379.	379.
1.000	904.0800	5.4133	.01	281.47	6.37	.18	1117.0000	29.7000	.07	379.	379.	379.
1.246	877.4100	4.9976	-.06	280.88	5.80	.23	1086.0000	25.8000	.07	393.	393.	393.
2.000	801.7000	4.3778	-.42	281.18	4.62	-.38	991.5000	17.2800	.69	393.	393.	393.
3.000	709.4000	4.2955	-.61	275.89	4.59	-.69	894.6000	13.0200	1.06	392.	392.	392.
4.000	626.2700	4.6264	-.66	270.70	4.50	-.82	805.3000	10.0200	.92	391.	391.	391.
5.000	551.5000	4.9302	-.72	264.65	4.33	-.84	725.5000	7.6700	.66	390.	390.	390.
6.000	483.3500	5.2608	-.69	257.73	4.16	-.71	653.9000	6.0710	.32	381.	381.	381.
7.000	423.2200	5.2970	-.72	250.66	3.92	-.74	588.1000	5.3210	-.19	375.	375.	375.
8.000	368.7800	5.2516	-.68	243.61	3.69	-.54	527.3000	5.4290	-.97	374.	374.	374.
9.000	320.0000	4.9891	-.67	236.34	3.36	-.26	471.6000	5.5550	-1.23	370.	370.	370.
10.000	276.4400	4.7171	-.53	229.07	3.07	-.06	420.4000	5.9880	-1.50	366.	366.	366.
11.000	237.7400	4.3071	-.39	222.47	2.75	.33	372.3000	6.9120	-1.19	353.	353.	353.
12.000	203.7400	3.6594	-.14	216.85	3.16	.38	327.4000	7.8080	-.77	351.	351.	351.
13.000	173.9300	3.0838	-.25	212.62	3.64	.16	285.1000	8.1620	-.32	339.	339.	339.
14.000	148.1200	2.4699	-.22	209.78	3.54	-.01	246.1000	7.2510	-.01	322.	322.	322.
15.000	125.8600	1.8838	-.26	207.51	3.50	.05	211.4000	6.0230	-.07	311.	311.	311.
16.000	106.7400	1.4727	-.23	206.30	3.30	.22	180.3000	4.8630	-.18	279.	279.	279.
17.000	90.5710	1.1153	-.23	205.85	3.22	.33	153.3000	3.7810	-.27	265.	265.	265.
18.000	76.8210	.8452	-.09	206.32	3.02	.29	129.7000	2.7960	-.23	255.	255.	255.
19.000	65.2230	.6711	-.05	208.11	2.22	-.01	109.2000	1.7630	-.03	248.	248.	248.
20.000	55.4590	.5633	.00	210.12	1.99	.14	91.9600	1.2410	-.13	243.	243.	243.
21.000	47.2440	.4883	.04	211.92	2.10	.07	77.6700	.9468	-.12	234.	234.	234.
22.000	40.2920	.4400	.11	213.47	2.25	.23	65.7600	.7493	.03	227.	227.	227.
23.000	34.4150	.4061	.17	215.03	2.26	.21	55.7600	.6121	-.20	217.	217.	217.
24.000	29.4080	.3836	.22	216.58	2.49	.04	47.3000	.5513	-.34	208.	208.	208.
25.000	25.1550	.3498	.18	217.74	2.60	-.04	40.2500	.4714	-.29	204.	204.	204.
26.000	21.5450	.3270	.24	219.07	2.69	-.02	34.2600	.4319	-.77	199.	199.	199.
27.000	18.4900	.3012	.28	220.64	2.69	-.01	29.2000	.3899	-.47	171.	171.	171.
28.000	15.8680	.2782	.30	222.05	2.89	.16	24.9000	.3564	-.21	171.	171.	171.
29.000	13.6570	.2515	.08	223.82	2.97	.52	21.2600	.3283	-.01	103.	103.	103.
30.000	11.7550	.3160	-.54	225.31	4.47	.09	18.1800	.4984	-.94	137.	144.	131.
32.000	8.7337	.2486	-.29	229.01	4.78	.54	13.3000	.3620	-.52	138.	145.	135.
34.000	6.5180	.2013	-.19	232.76	5.00	.63	9.7630	.3050	-.07	138.	146.	137.
36.000	4.8879	.1591	-.05	236.57	5.71	.20	7.2050	.2556	.05	138.	146.	138.
38.000	3.6818	.1274	.11	241.29	5.65	.64	5.3220	.1864	-.33	137.	144.	137.
40.000	2.7939	.1034	.29	246.94	6.08	.24	3.9450	.1512	-.18	137.	144.	137.
42.000	2.1328	.0832	.41	252.99	6.76	.36	2.9390	.1140	.03	137.	144.	137.
44.000	1.6387	.0681	.50	258.50	6.66	.12	2.2110	.0922	.13	136.	144.	136.
46.000	1.2657	.0557	.55	262.77	7.77	.25	1.6800	.0735	.13	135.	142.	135.
48.000	.9809	.0465	.59	265.20	7.41	.09	1.2900	.0521	.13	135.	142.	135.
50.000	.7617	.0396	.64	265.45	7.59	.40	1.0010	.0421	.41	135.	141.	135.
52.000	.5910	.0336	.63	263.59	7.33	.32	.7816	.0353	.35	133.	137.	133.
54.000	.4574	.0279	.70	261.90	7.68	.63	.6095	.0296	.23	132.	140.	132.
56.000	.3533	.0231	.77	259.04	8.29	.47	.4761	.0259	.12	130.	137.	130.
58.000	.2720	.0192	.86	256.32	7.67	.30	.3702	.0216	.43	126.	133.	126.
60.000	.2090	.0161	.90	252.14	8.57	.25	.2894	.0178	.60	116.	122.	116.
62.000	.1607	.0135	.86	248.64	9.22	.37	.2257	.0153	.67	102.	108.	102.
64.000	.1212	.0105	1.02	245.01	10.74	.39	.1728	.0133	.60	86.	91.	86.
66.000	.0939	.0091	1.20	238.54	13.36	.49	.1330	.0128	.68	63.	65.	63.
68.000	.0677	.0078	1.44	230.32	16.16	.50	.1026	.0102	1.06	52.	54.	52.
70.000	.0483	.0044	.39	223.25	14.70	.73	.0766	.0061	.89	43.	45.	43.

TABLE II-12. THERMODYNAMIC STATISTICAL PARAMETERS

DECEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1021.7000	8.6346	-.02	278.92	9.19	.20	1275.0000	51.8500	.02	314.	314.	314.
1.000	903.5600	5.7171	-.19	276.94	6.06	.40	1135.0000	29.0600	-.10	314.	314.	314.
1.246	876.4500	5.3184	-.24	276.50	5.42	.44	1103.0000	24.6800	-.12	321.	321.	321.
2.000	739.8800	4.9235	-.34	277.75	4.79	-.42	1002.0000	16.9700	.60	320.	320.	320.
3.000	706.8000	5.1044	-.37	273.01	4.71	-.47	900.9000	11.9100	.58	319.	319.	319.
4.000	623.1600	5.5651	-.43	267.91	4.52	-.62	809.7000	8.7190	.55	319.	319.	319.
5.000	548.0300	5.9465	-.48	261.90	4.33	-.59	728.6000	6.8730	.37	317.	317.	317.
6.000	480.3200	6.0395	-.52	255.11	4.09	-.75	655.7000	5.5690	.44	316.	316.	316.
7.000	419.4700	6.0459	-.54	247.94	4.05	-.73	589.3000	5.5950	-.18	315.	315.	315.
8.000	364.9700	5.8853	-.56	240.92	3.89	-.70	527.9000	5.7760	-.74	310.	310.	310.
9.000	316.1200	5.6110	-.56	233.60	3.52	-.37	471.4000	6.1320	-.86	308.	308.	308.
10.000	272.6000	5.2093	-.48	226.81	3.03	14	418.7000	7.3060	-1.05	303.	303.	303.
11.000	234.1300	4.3440	-.42	220.63	[illegible]	.07	363.5000	8.9520	-.93	287.	287.	287.
12.000	200.5600	3.7775	-.38	215.79	4.19	.75	323.9000	9.8690	-.66	283.	283.	283.
13.000	171.1800	3.0280	-.30	213.11	4.52	.26	280.0000	9.1090	-.19	264.	264.	264.
14.000	145.8700	2.4099	-.26	211.63	3.66	.20	240.2000	6.7480	-.23	243.	243.	243.
15.000	124.2800	1.8937	-.23	209.62	3.12	.42	206.6000	5.3160	-.26	222.	222.	222.
16.000	105.4700	1.4472	-.10	208.05	3.12	.18	176.7000	4.4720	-.18	206.	206.	206.
17.000	89.5870	1.0970	-.04	207.32	3.27	.15	150.6000	3.7790	-.09	192.	192.	192.
18.000	76.0470	.8204	-.05	207.35	3.41	.00	127.8000	3.0500	.14	191.	191.	191.
19.000	64.6070	.6249	-.26	208.15	3.06	-.05	108.2000	2.1740	.34	185.	185.	185.
20.000	54.9180	.4963	-.40	209.68	2.68	-.18	91.2600	1.5610	.40	176.	176.	176.
21.000	46.7530	.4120	-.39	211.31	2.50	-.01	77.0900	1.1510	.16	173.	173.	173.
22.000	39.8400	.3578	-.37	212.65	2.49	-.02	65.2700	.8985	.05	170.	170.	170.
23.000	34.0100	.3282	-.28	214.22	2.24	-.01	55.3100	.6440	.06	168.	168.	168.
24.000	29.0400	.2931	-.13	215.75	2.29	.11	46.8900	.5109	-.13	156.	156.	156.
25.000	24.8530	.2596	.28	217.21	2.55	.31	39.8800	.4420	-.64	144.	144.	144.
26.000	21.2800	.2466	.40	218.51	2.90	.54	33.9300	.3964	-1.07	144.	144.	144.
27.000	18.2330	.2400	.43	219.93	3.12	.71	28.8800	.3319	-1.02	128.	128.	128.
28.000	15.6390	.2301	.39	221.35	3.20	.60	24.6100	[illegible]	-.47	128.	128.	128.
29.000	13.4170	.2071	.46	222.22	2.66	.71	21.0300		.02	73.	73.	73.
30.000	11.6120	.2562	-.33	224.43	4.53	.42	18.0300		-1.28	140.	153.	135.
32.000	8.6171	.2111	-.04	228.55	5.62	.58	13.1500	.3439	-1.07	138.	151.	136.
34.000	6.4331	.1768	14	[illegible]	6.71	.64	9.6040	.2794	-.26	141.	154.	139.
36.000	4.8278	.1502	.42	238.27	7.58	.29	7.0660	.2411	-.01	138.	151.	136.
38.000	3.6453	.1281	.56	243.52	7.52	.53	5.2170	.1840	.05	138.	151.	138.
40.000	2.7738	.1070	.79	250.33	8.57	.06	3.8630	.1627	-.22	138.	151.	138.
42.000	2.1257	.0907	.99	257.24	10.10	.14	2.8810	.1281	-.28	138.	151.	139.
44.000	1.6406	.0758	1.10	263.32	9.66	-.06	2.1670	.0963	.24	136.	146.	136.
46.000	1.2723	.0622	1.09	267.73	8.68	-.35	1.6540	.0753	.54	136.	144.	136.
48.000	.9905	.0521	1.03	269.23	9.73	.24	1.2810	.0629	.62	133.	137.	133.
50.000	.7715	.0441	.86	268.85	9.12	.14	.9992	.0504	.88	133.	140.	133.
52.000	.6011	.0364	.75	267.06	8.42	.09	.7839	.0401	.75	132.	140.	132.
54.000	.4668	.0302	.71	263.88	7.84	-.13	.6163	.0336	.74	131.	142.	131.
56.000	.3604	.0245	.67	259.75	7.67	-.13	.4833	.0265	.33	127.	139.	127.
58.000	.2771	.0192	.57	255.66	7.37	-.01	.3773	.0229	.17	123.	133.	123.
60.000	.2140	.0156	.56	251.94	9.23	-.08	.2958	.0197	.15	112.	121.	112.
62.000	.1636	.0129	.56	248.65	11.60	-.01	.2294	.0153	.22	96.	103.	96.
64.000	.1231	.0100	.32	244.71	13.04	.07	.1752	.0113	.09	64.	68.	64.
66.000	.0923	.0083	.06	239.07	15.60	-.72	.1347	.0095	.07	34.	34.	34.
68.000	.0703	.0073	-.32	232.01	18.88	-.60	.1056	.0060	-.59	20.	20.	20.
70.000	.0507	.0078	.13	220.29	20.00	.15	.0797	.0062	-.53	10.	10.	10.

TABLE II-13. THERMODYNAMIC STATISTICAL PARAMETERS

ANNUAL

STATION • 722698 WHITE SAND MISSILE RANGE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1013.7000	8.6711	.54	293.91	13.08	-.21	1199.0000	65.6300	.46	4493.	4493.	4493.
1.000	901.4900	4.7996	.20	288.97	10.36	-.14	1084.0000	43.4900	.35	4493.	4493.	4493.
1.246	875.4500	4.3795	.01	287.75	9.78	-.13	1058.0000	39.1000	.33	4638.	4640.	4638.
2.000	801.2400	4.2185	-.57	285.89	7.80	-.33	974.3000	26.4700	.45	4632.	4632.	4632.
3.000	710.2100	5.1128	-.63	279.10	6.97	-.40	885.0000	18.5000	.45	4625.	4625.	4625.
4.000	627.7300	6.1674	-.60	272.38	6.17	-.54	801.8000	12.3300	.55	4598.	4598.	4598.
5.000	553.2000	6.9111	-.62	265.69	5.85	-.62	724.7000	8.8200	.58	4564.	4564.	4564.
6.000	485.8400	7.4642	-.59	258.93	6.01	-.51	653.3000	7.0980	.36	4516.	4516.	4516.
7.000	425.2000	7.7766	-.55	252.02	6.28	-.32	587.6000	5.9650	.13	4477.	4477.	4477.
8.000	370.8300	7.9190	-.48	244.89	6.35	-.16	527.4000	5.2160	-.17	4446.	4446.	4446.
9.000	322.0100	7.9257	-.38	237.59	5.21	.02	472.1000	4.8990	-.72	4395.	4395.	4395.
10.000	[illegible]	[illegible]	.27	[illegible]	[illegible]	.15	[illegible]	[illegible]	-1.55	4322.	4322.	4322.
11.000	239.8500	7.4764	-.15	224.01	5.02	.17	373.0000	7.4310	-1.74	4195.	4195.	4195.
12.000	205.7000	6.7202	-.06	218.44	4.50	-.22	328.1000	9.2680	-1.34	4154.	4154.	4154.
13.000	175.9400	5.9811	.02	214.54	3.72	-.23	285.8000	10.6500	-.63	4026.	4026.	4026.
14.000	150.0300	5.0223	.06	211.52	3.47	.26	247.2000	10.7100	-.15	3864.	3864.	3864.
15.000	127.7100	4.0403	.08	208.75	3.90	.24	213.3000	9.7830	.05	3710.	3710.	3710.
16.000	108.3700	3.2675	.09	207.16	3.89	.22	183.4000	8.0970	.09	3444.	3444.	3444.
17.000	91.9950	2.6180	.06	206.82	3.52	.22	155.0000	6.1570	.01	3270.	3270.	3270.
18.000	78.1090	2.1548	.05	207.91	3.11	.00	130.9000	4.3390	-.12	[illegible]	3210.	3210.
19.000	66.3900	1.8409	.36	209.98	2.78	-.41	110.2000	3.0630	-.11	3098.	3098.	3098.
20.000	56.5500	1.6157	.05	212.14	2.70	-.61	92.8600	2.3390	-.08	3011.	3011.	3011.
21.000	48.2480	1.4282	.02	214.16	2.84	-.58	78.4800	1.8880	-.07	2908.	2908.	2908.
22.000	41.2340	1.2722	.00	215.53	2.96	-.59	66.5200	1.6030	-.10	2845.	2845.	2845.
23.000	35.2540	1.1417	-.02	217.61	3.00	-.58	56.4500	1.3780	-.05	2709.	2709.	2709.
24.000	30.[illegible]70	1.0232	-.07	219.34	3.16	-.60	47.9900	1.2270	-.07	2643.	2643.	2643.
25.000	25.[illegible]100	.9100	-.09	220.96	3.26	-.58	40.8400	1.0820	-.08	2514.	2514.	2514.
26.000	22.2240	.8189	-.08	222.46	3.43	-.53	34.8000	.9536	-.06	2374.	2374.	2374.
27.000	19.1130	.7372	-.12	224.11	3.56	-.43	29.7000	.8579	-.07	2146.	2146.	2146.
28.000	16.4260	.6554	-.11	225.64	3.67	-.44	25.3600	.7655	-.08	2089.	2089.	2089.
29.000	14.1770	.5872	-.17	227.35	3.72	-.26	21.7200	.6956	-.11	1465.	1465.	1465.
30.000	12.1000	.5063	.06	228.85	4.74	-.13	18.4400	.6356	-.18	1605.	1696.	1542.
32.000	9.0313	.4068	.06	233.03	5.23	-.15	13.5100	.5204	-.19	1590.	1687.	1560.
34.000	6.7747	.3249	.05	237.58	5.75	.00	9.9380	.4251	-.18	1603.	[illegible]	[illegible]
36.000	5.1133	.2609	.04	242.32	6.29	-.09	7.3550	.3492	-.17	1592.	1692.	1529.
38.000	3.8818	.2089	.02	247.64	6.73	.13	5.4640	.2718	-.18	1589.	1690.	1589.
40.000	2.9646	.1680	.02	253.46	7.04	.00	4.0770	.2109	-.16	1587.	1688.	1587.
42.000	2.2796	.1365	-.01	259.10	7.04	-.12	3.0650	.1676	-.13	1585.	1682.	1585.
44.000	1.7624	.1104	-.01	263.85	6.45	-.17	2.3260	.1339	-.13	1581.	1651.	1581.
46.000	1.3877	.0837	-.02	266.70	6.19	-.05	1.7850	.1073	-.13	1576.	1613.	1576.
48.000	1.0634	.0716	.00	267.85	6.07	.11	1.3820	.0853	-.09	1563.	1590.	1563.
50.000	.9276	.0575	-.01	267.34	6.03	.05	1.0780	.0677	-.08	1562.	1601.	1562.
52.000	.6431	.0462	.00	265.50	5.03	-.10	.8435	.0541	-.04	1542.	1603.	1542.
54.000	.4987	.0373	.00	262.94	6.16	-.12	.6608	.0439	-.04	1523.	1512.	1523.
56.000	.3855	.0301	.02	259.87	6.42	-.13	.5168	.0358	-.07	1484.	1569.	1484.
58.000	.2976	.0242	.02	256.95	6.67	-.14	.4035	.0296	-.05	1420.	1513.	1420.
60.000	.2289	.0193	.02	253.30	7.45	-.11	.3150	.0241	-.06	1314.	1399.	1314.
62.000	.1757	.0152	.01	249.36	8.35	-.07	.2455	.0192	-.05	1118.	1193.	1118.
64.000	.1338	.0121	.00	245.07	9.51	-.06	.1903	.0157	-.12	864.	929.	864.
66.000	.1015	.0097	-.07	240.89	11.10	-.25	.1469	.0129	-.18	564.	597.	564.
68.000	.0763	.0079	-.15	235.89	14.02	-.20	.1130	.0101	-.06	388.	412.	388.
70.000	.0562	.0065	-.27	228.88	14.99	.03	.0858	.0082	-.24	262.	271.	262.

TABLE III-1. MOISTURE RELATED STATISTICAL PARAMETERS

JANUARY

STATION = 722696 WHITE SAND MISSILE RANGE

Z	VAPOR P MEAN	S.D. VP	SKEW VP	TV MEAN	TV S.D.	SKEW TV	DEWPT T MEAN	S.D. DPT	SKEW DPT	NOBS T+P	NOBS TV
KM	MB	MB		DEG K	DEG K		DEG K	DEG K			
.000	5.935	3.818	1.82	281.09	10.98	.30	270.42	8.66	-.14	329.	329.
1.000	4.616	2.119	.92	278.36	7.84	.14	268.06	6.49	-.50	329.	329.
1.246	4.337	1.830	.70	277.47	6.91	.09	267.40	6.05	-.63	347.	348.
2.000	3.462	1.411	.47	278.16	5.31	-.98	264.56	5.67	-.49	343.	340.
3.000	2.332	1.162	.73	273.00	5.06	-.87	259.16	6.62	-.52	330.	347.
4.000	1.351	.807	1.34	267.55	4.76	-.42	252.32	6.91	-.20	315.	345.
5.000	.775	.511	1.81	261.25	4.58	-.32	245.97	6.71	.02	301.	340.
6.000	.461	.319	1.67	254.27	4.42	-.31	240.36	6.61	.11	287.	330.
7.000	.256	.175	1.31	246.79	4.36	-.29	234.44	6.40	.13	277.	322.
8.000	.130	.084	.98	239.28	4.23	-.17	228.00	6.42	-.33	246.	316.
9.000	.056	.039	.78	231.77	3.80	.01	219.99	7.32	-.71	147.	308.
10.000	.026	.015	.36	224.80	3.24	.01	214.73	5.61	-.81	35.	295.
11.000	99.999	99.999	999.99	219.39	3.16	.32	999.99	99.99	999.99	[illegible]	[illegible]
12.000	99.999	99.999	999.99	215.43	4.76	.47	999.99	99.99	999.99	5.	277.
13.000	99.999	99.999	999.99	213.97	4.99	-.05	999.99	99.99	999.99	5.	267.
14.000	99.999	99.999	999.99	212.47	4.03	-.35	999.99	99.99	999.99	3.	253.
15.000	99.999	99.999	999.99	210.13	3.58	-.33	999.99	99.99	999.99	1.	235.
16.000	99.999	99.999	999.99	207.78	3.72	-.42	999.99	99.99	999.99	0.	227.
17.000	99.999	99.999	999.99	206.75	3.89	-.33	999.99	99.99	999.99	0.	212.
18.000	99.999	99.999	999.99	206.79	4.12	-.23	999.99	99.99	999.99	0.	204.
19.000	99.999	99.999	999.99	207.88	3.68	-.36	999.99	99.99	999.99	0.	200.
20.000	99.999	99.999	999.99	209.26	3.31	-.41	999.99	99.99	999.99	0.	189.
21.000	99.999	99.999	999.99	210.75	3.16	-.36	999.99	99.99	999.99	0.	178.
22.000	99.999	99.999	999.99	212.42	3.13	-.28	999.99	99.99	999.99	0.	165.
23.000	99.999	99.999	999.99	213.82	3.10	-.19	999.99	99.99	999.99	0.	162.
24.000	99.999	99.999	999.99	215.26	3.37	.04	999.99	99.99	999.99	0.	149.
25.000	99.999	99.999	999.99	217.02	3.28	.26	999.99	99.99	999.99	0.	137.
26.000	99.999	99.999	999.99	218.50	3.08	.52	999.99	99.99	999.99	0.	134.
27.000	99.999	99.999	999.99	220.08	3.30	.68	999.99	99.99	999.99	0.	119.
28.000	99.999	99.999	999.99	221.62	3.72	.68	999.99	99.99	999.99	0.	117.
29.000	99.999	99.999	999.99	222.90	3.08	-.01	999.99	99.99	999.99	0.	73.
30.000	99.999	99.999	999.99	226.70	4.88	.18	999.99	99.99	999.99	0.	174.

TABLE III-2. MOISTURE RELATED STATISTICAL PARAMETERS

FEBRUARY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	6.468	3.310	.83	284.97	10.33	.23	272.25	7.52	-.38	379.	379.
1.000	4.655	1.957	.74	280.49	7.28	.38	268.40	5.84	-.35	379.	379.
1.246	4.292	1.745	.69	279.37	6.60	.41	267.39	5.62	-.39	386.	386.
2.000	3.310	1.342	.91	277.91	4.98	-.22	264.12	5.10	.06	384.	385.
3.000	2.191	.990	1.00	271.62	4.64	-.41	258.71	5.53	-.08	379.	384.
4.000	1.229	.667	1.34	265.54	4.47	-.61	251.62	5.87	.05	366.	381.
5.000	.709	.437	1.35	259.12	4.57	-.84	245.16	6.39	.05	342.	370.
6.000	.399	.245	1.29	252.09	4.66	-.94	239.20	6.03	.06	336.	367.
7.000	.222	.141	1.09	244.93	4.21	-.72	233.21	6.27	-.22	319.	359.
8.000	.118	.074	.84	237.67	3.87	-.41	227.19	6.38	-.61	261.	355.
9.000	.053	.041	1.07	230.66	3.38	.15	219.45	7.28	-.26	159.	347.
10.000	.021	.018	1.47	224.48	3.33	.68	211.84	6.89	.03	46.	338.
11.000	99.999	99.999	999.99	220.17	4.07	.72	999.99	99.99	999.99	2.	326.
12.000	99.999	99.999	999.99	217.63	5.46	-.06	999.99	99.99	999.99	2.	309.
13.000	99.999	99.999	999.99	216.45	4.91	-.68	999.99	99.99	999.93	1.	296.
14.000	99.999	99.999	999.99	214.24	3.64	-.58	999.99	99.99	999.99	1.	279.
15.000	99.999	99.999	999.99	211.64	3.20	-.21	999.99	99.99	999.99	0.	263.
16.000	99.999	99.999	999.99	209.26	3.18	.04	999.99	99.99	999.99	0.	252.
17.000	99.999	99.999	999.99	208.01	3.24	.02	999.99	99.99	999.99	0.	241.
18.000	99.999	99.999	999.99	207.89	3.27	-.10	999.99	99.99	999.99	0.	231.
19.000	99.999	99.999	999.99	208.95	3.09	-.14	999.99	99.99	999.99	0.	231.
20.000	99.999	99.999	999.99	210.50	2.71	-.14	999.99	99.99	999.99	0.	226.
21.000	99.999	99.999	999.99	212.03	2.62	-.05	999.99	99.99	999.99	0.	218.
22.000	99.999	99.999	999.99	213.60	2.90	.14	999.99	99.99	999.99	0.	206.
23.000	99.999	99.999	999.99	215.03	2.68	.15	999.99	99.99	999.99	0.	203.
24.000	99.999	99.999	999.99	216.56	2.83	.14	999.99	99.99	999.99	0.	192.
25.000	99.999	99.999	999.99	218.22	2.89	-.05	999.99	99.99	999.99	0.	181.
26.000	99.999	99.999	999.99	219.75	3.13	.07	999.99	99.99	999.99	0.	177.
27.000	99.999	99.999	999.99	221.42	3.15	.19	999.99	99.99	999.99	0.	158.
28.000	99.999	99.999	999.99	223.16	3.28	.45	999.99	99.99	999.99	0.	156.
29.000	99.999	99.999	999.99	224.90	3.14	.50	999.99	99.99	999.99	0.	114.
30.000	99.999	99.999	999.99	227.07	4.76	-.08	999.99	99.99	999.99	0.	[illegible]

TABLE III-3. MOISTURE RELATED STATISTICAL PARAMETERS

MARCH

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	7.329	4.473	3.61	288.57	10.28	.24	273.76	7.95	-.21	396.	396.
1.000	5.060	2.548	2.80	283.34	7.46	.37	269.31	6.24	.03	396.	396.
1.246	4.579	2.218	2.53	282.26	7.01	.37	268.08	5.93	.12	410.	411.
2.000	3.449	1.382	.76	280.10	5.86	.00	264.62	5.30	-.36	402.	411.
3.000	2.289	.977	.82	273.09	5.53	-.22	259.39	5.35	-.24	397.	411.
4.000	1.347	.722	1.05	266.23	5.15	-.45	252.51	6.56	-.50	387.	411.
5.000	.771	.475	1.23	259.46	4.94	-.58	245.99	6.63	-.02	372.	408.
6.000	.429	.290	1.53	252.45	4.75	-.61	239.68	6.45	.16	368.	406.
7.000	.231	.162	1.65	245.16	4.62	-.47	233.50	6.17	.24	359.	403.
8.000	.117	.079	1.26	237.97	4.34	-.32	226.98	6.70	-.64	295.	393.
9.000	.054	.041	1.00	230.91	3.79	.04	219.58	7.14	-.22	153.	383.
10.000	.022	.019	1.51	224.46	3.35	.35	211.97	7.50	-.59	43.	372.
11.000	99.999	99.999	999.99	219.63	3.57	.63	999.99	99.99	999.99	5	[illegible]
12.000	99.959	99.999	999.99	216.26	4.96	.31	999.99	99.99	959.99	5.	351.
13.000	99.999	99.999	999.99	215.10	4.57	-.21	999.99	99.99	999.99	2.	338.
14.000	99.999	99.999	999.99	213.80	3.48	-.12	999.99	99.99	999.99	2.	324.
15.000	99.999	99.999	999.99	211.69	3.30	.00	999.99	99.99	999.99	0.	307.
16.000	99.999	99.999	999.99	210.11	3.39	-.09	999.99	99.99	999.99	0.	306.
17.000	99.999	99.999	999.99	209.42	3.53	-.06	999.99	99.99	999.99	0.	290.
18.000	99.999	99.999	999.99	209.40	3.56	-.09	999.99	99.99	999.99	0.	28[illegible].
19.000	99.999	99.999	999.99	210.35	3.14	-.10	999.99	99.99	999.99	0.	274.
20.000	99.999	99.999	999.99	211.82	2.61	.03	999.99	99.99	999.99	0.	267.
21.000	99.999	99.999	999.99	213.55	2.61	.24	999.99	99.99	999.99	0.	256.
22.000	99.999	99.999	999.99	215.20	2.82	.30	999.99	99.99	999.99	0.	244.
23.000	99.999	99.999	999.99	216.86	2.79	.49	999.99	99.99	999.99	0.	237.
24.000	99.999	99.999	999.99	213.57	3.12	.57	999.99	99.99	999.99	0.	226.
25.000	99.999	99.999	999.99	220.26	3.30	.43	999.89	99.99	999.99	0.	218.
25.000	99.999	99.999	999.99	221.81	3.62	.18	939.89	99.99	999.99	0.	204.
27.000	99.999	89.999	999.99	223.50	3.72	.14	999.99	99.99	999.99	0.	181.
28.000	99.999	99.999	999.99	225.28	4.01	.27	999.99	99.99	999.99	0.	181.
29.000	99.939	99.999	999.99	227.50	4.11	.37	999.99	99.99	999.59	0.	136.
30.000	93.999	99.999	999.99	228.96	4.21	.67	999.89	99.99	099.99	0.	132.

TABLE III-4. MOISTURE RELATED STATISTICAL PARAMETERS

APRIL

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	8.427	3.916	.86	296.18	9.67	.17	276.28	6.79	-.21	399.	399.
1.000	5.613	2.272	.78	289.71	6.79	.24	271.01	5.58	-.17	399.	399.
1.246	4.970	2.030	.76	288.24	6.15	.22	269.35	5.58	-.20	429.	429.
2.000	4.121	1.629	.73	285.12	4.26	-.43	266.86	5.77	-1.11	406.	425.
3.000	2.664	1.097	.96	277.07	3.96	-.40	261.33	5.25	-.31	399.	422.
4.000	1.596	.760	1.12	269.81	3.54	-.54	254.88	5.72	-.35	375.	412.
5.000	.898	.519	1.54	262.86	3.41	-.66	248.01	5.80	.25	363.	408.
6.000	.477	.264	1.48	255.84	3.25	-.80	241.33	5.52	-.02	362.	406.
7.000	.253	.133	1.56	248.56	3.11	-.73	235.12	4.85	.05	354.	403.
8.000	.129	.068	1.17	241.26	2.89	-.48	228.70	4.97	-.43	335.	401.
9.000	.056	.037	1.05	233.99	2.69	-.24	220.63	5.97	-.33	[illegible]	401.
10.000	.021	.014	1.29	226.87	2.41	-.06	212.99	5.15	-.11	68.	398.
11.000	99.999	99.999	999.99	220.57	2.50	.58	999.99	99.99	999.99	5.	382.
12.000	99.999	99.999	999.99	215.45	3.74	.82	999.99	99.99	999.99	4.	380.
13.000	99.999	99.999	999.99	213.96	4.15	.01	999.99	99.99	999.99	0.	359.
14.000	99.999	99.999	999.99	213.52	3.15	-.31	999.99	99.99	999.99	0.	351.
15.000	99.999	99.999	999.99	212.07	2.91	-.09	999.99	99.99	999.99	0.	336.
16.000	99.999	99.999	999.99	210.76	2.95	-.08	999.99	99.99	999.99	0.	316.
17.000	99.999	99.999	999.99	209.92	2.90	-.22	999.99	99.99	999.99	0.	286.
18.000	99.999	99.999	999.99	209.72	2.94	-.17	999.99	99.99	999.99	0.	281.
19.000	99.999	99.999	999.99	210.62	2.57	-.26	999.99	99.99	999.99	0.	266.
20.000	99.999	99.999	999.99	212.51	2.62	-.28	999.99	99.99	999.99	0.	257.
21.000	99.999	99.999	999.99	214.34	2.73	-.36	999.99	99.99	999.99	0.	246.
22.000	99.999	99.999	999.99	216.16	2.82	-.38	999.99	99.99	999.99	0.	245.
23.000	99.999	99.999	999.99	217.91	2.65	-.53	999.99	99.99	999.99	0.	225.
24.000	99.999	99.999	999.99	219.63	2.76	-.43	999.99	99.99	999.99	0.	220.
25.000	99.999	99.999	999.99	221.10	2.73	-.38	999.99	99.99	999.99	0.	215.
26.000	99.999	99.999	999.99	222.50	2.65	-.42	999.99	99.99	999.99	0.	206.
27.000	99.999	99.999	999.99	224.32	2.61	-.40	999.99	99.99	999.99	0.	188.
28.000	99.999	99.999	999.99	226.43	2.62	-.48	999.99	99.99	999.99	0.	188.
29.000	99.999	99.999	999.99	228.18	2.71	-.20	999.99	99.99	999.99	0.	121.
30.000	99.999	99.999	999.99	230.54	4.10	.10	999.99	99.99	999.99	0.	134.

TABLE III-5. MOISTURE RELATED STATISTICAL PARAMETERS

MAY

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	11.836	6.518	3.70	303.86	9.98	.15	280.97	7.45	.01	455.	455.
1.000	7.816	3.865	3.00	296.68	7.17	.15	275.28	6.47	.06	455.	455.
1.246	6.867	3.446	2.63	294.92	6.63	.12	273.42	6.55	.05	487.	487.
2.000	5.611	2.121	.49	291.11	4.37	-.42	271.05	5.62	-.80	459.	486.
3.000	3.687	1.394	.46	282.70	4.01	-.47	265.53	5.22	-.47	455.	485.
4.000	2.331	1.007	.46	274.49	3.54	-.65	259.47	5.85	-.58	457.	482.
5.000	1.398	.708	.50	266.65	3.06	-.66	252.98	6.51	-.42	447.	481.
6.000	.703	.417	1.12	259.28	2.93	-.40	245.10	6.38	-.04	431.	475.
7.000	.342	.194	1.35	251.89	2.88	-.48	237.88	5.46	.10	429.	472.
8.000	.174	.099	1.43	244.35	2.86	-.21	231.31	5.21	-.08	417.	472.
9.000	.081	.051	1.22	236.72	2.82	.02	224.13	5.63	-.23	335.	465.
10.000	.032	.020	1.47	229.14	2.71	.07	216.65	4.74	.00	157.	458.
11.000	.017	.007	.68	222.16	2.55	.27	212.29	3.46	-.36	58.	[illegible]
12.000	.009	.005	.38	216.32	2.83	.62	207.27	5.40	-2.26	58.	447.
13.000	.008	.004	1.08	213.27	3.46	.53	206.48	3.31	.01	53.	431.
14.000	.007	.003	.75	212.57	3.49	-.07	205.95	2.70	.23	49.	406.
15.000	.006	.002	.38	211.45	3.03	.01	204.42	1.94	.11	34.	393.
16.000	99.999	99.999	999.99	210.03	2.91	-.13	999.99	99.99	999.99	0.	343.
17.000	99.999	99.999	999.99	209.03	2.67	-.13	999.99	99.99	999.99	0.	316.
18.000	99.999	99.999	999.99	208.94	2.55	-.04	999.99	99.99	999.99	0.	305.
19.000	99.999	99.999	999.99	210.69	2.26	-.18	999.99	99.99	999.99	0.	296.
20.000	99.999	99.999	999.99	213.06	2.11	-.33	999.99	99.99	999.99	0.	208.
21.000	99.999	99.999	999.99	215.37	2.12	-.26	999.99	99.99	999.99	0.	276.
22.000	99.999	99.999	999.99	217.22	2.07	-.25	999.99	99.99	999.99	0.	276.
23.000	99.999	99.999	999.99	219.08	1.98	-.42	999.99	99.99	999.99	0.	262.
24.000	99.999	99.999	999.99	220.93	2.08	-.61	999.99	99.99	999.99	0.	262.
25.000	99.999	99.999	999.99	222.73	2.11	-.81	999.99	99.99	999.99	0.	246.
26.000	99.999	99.999	999.99	224.58	2.05	-.58	999.99	99.99	999.99	0.	230.
27.000	99.999	99.999	999.99	226.33	2.19	-.21	999.99	99.99	999.99	0.	192.
28.000	99.999	99.999	999.99	228.19	2.18	-.10	999.99	99.99	999.99	0.	192.
29.000	99.999	99.999	999.99	229.99	2.26	.29	999.99	99.99	999.99	0.	124.
30.000	99.999	99.999	999.99	231.75	2.79	.50	999.99	99.99	999.99	0.	144.

TABLE III-6. MOISTURE RELATED STATISTICAL PARAMETERS

JUNE

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	14.782	5.858	.34	307.05	8.28	.19	284.75	8.73	-.66	380.	380.
1.000	10.225	[illegible]	.31	300.31	5.81	.14	279.41	6.06	-.54	380.	380.
1.246	9.314	3.558	.35	298.72	5.31	.12	278.08	5.95	-.49	386.	385.
2.000	7.260	2.490	.46	295.35	3.45	-.03	274.77	5.13	-.66	378.	386.
3.000	5.014	1.699	.44	287.21	3.22	-.14	269.76	4.76	-.40	382.	387.
4.000	3.362	1.267	.30	279.02	2.80	-.09	264.32	5.30	-.66	381.	387.
5.000	2.094	.995	.49	270.97	2.46	-.08	257.99	6.16	-.35	379.	387.
6.000	1.124	.623	.94	263.62	2.53	.09	250.46	6.22	.10	357.	386.
7.000	.529	.287	1.65	256.73	2.75	.03	242.56	5.11	.42	345.	386.
8.000	.261	.147	2.09	249.49	2.89	.00	235.48	4.60	.73	336.	384.
9.000	[illegible]	.070	[illegible]	[illegible]	[illegible]	-.08	[illegible]	4.55	.24	317.	383.
10.000	.052	.031	1.70	234.20	2.98	-.20	220.62	4.79	-.10	193.	374.
11.000	.025	.010	1.64	226.73	2.89	-.32	215.48	2.94	.38	82.	363.
12.000	.010	.004	.07	220.05	2.85	-.52	208.38	3.87	-1.89	75.	353.
13.000	.006	.003	1.66	214.78	2.62	-.30	204.64	3.70	-2.03	65.	358.
14.000	.004	.002	2.90	211.06	2.60	.38	201.78	2.91	.84	63.	344.
15.000	.004	.002	.67	208.14	3.04	.36	200.03	3.38	-.18	22.	333.
16.000	99.999	99.999	999.99	206.43	3.05	.25	939.99	99.99	999.99	0.	307.
17.000	99.999	99.999	999.99	206.27	2.86	.31	999.99	99.99	999.99	0.	301.
18.000	99.999	99.999	999.99	208.19	2.64	.09	999.99	99.99	999.99	0.	300.
19.000	99.999	99.999	999.99	211.14	1.87	.22	999.99	99.99	999.99	0.	280.
20.000	99.999	99.999	999.99	213.70	1.54	-.11	999.99	99.99	999.99	0.	277.
21.000	99.999	99.999	999.99	216.07	1.71	-.16	999.99	99.99	999.99	0.	[illegible]
22.000	99.999	99.999	999.99	217.99	1.70	-.20	999.99	99.99	999.99	0.	267.
23.000	99.999	99.999	999.99	219.94	1.53	.17	999.99	99.99	999.99	0.	250.
24.000	99.999	99.999	999.99	221.85	1.58	.05	999.99	99.99	999.99	0.	250.
25.000	99.999	99.999	999.99	223.68	1.55	.04	999.99	99.99	999.99	0.	235.
26.000	99.999	99.999	999.99	225.52	1.57	.31	999.99	99.99	999.99	0.	224.
27.000	99.999	99.999	999.99	227.32	1.89	.54	999.99	99.99	999.99	0.	204.
28.000	99.999	99.999	999.99	228.81	1.72	.23	999.99	99.99	999.99	0.	192.
29.000	99.999	99.999	999.99	230.31	1.98	.37	999.99	99.99	999.99	0.	[illegible]
30.000	99.999	99.999	999.99	232.19	2.61	.69	999.99	99.99	999.99	0.	129.

TABLE III-7. MOISTURE RELATED STATISTICAL PARAMETERS

JULY

STATION = 722698 WHITE SAND MISSILE RANGE

Z	VAPOR P MEAN	S.D. VP	SKEW VP	TV MEAN	TV S.D.	SKEW TV	DEWPT T MEAN	S.D. DPT	SKEW DPT	NOBS T+P	NOBS TV
KM	MB	MB		DEG K	DEG K		DEG K	DEG K			
.000	24.050	5.190	-.16	308.77	6.12	.66	293.25	3.71	-.63	351.	351.
1.000	16.807	3.256	-.22	301.91	4.20	.58	287.66	3.17	-.63	351.	351.
1.246	15.379	2.988	-.18	300.24	3.78	.53	286.29	3.13	-.60	353.	353.
2.000	11.198	2.307	-.24	296.29	2.69	-.08	281.48	3.29	-.95	352.	353.
3.000	8.132	1.816	-.02	288.64	2.21	.04	276.82	3.36	-.64	353.	354.
4.000	5.391	1.448	-.08	280.79	1.70	.25	270.95	4.08	-1.17	350.	352.
5.000	3.327	1.233	-.06	273.35	1.38	-.03	264.13	5.56	-.92	342.	350.
6.000	1.865	.891	.33	266.73	1.53	-.08	256.48	6.48	-.51	329.	349.
7.000	.925	.502	.84	260.56	1.51	.02	248.24	6.33	-.27	326.	349.
8.000	.442	.250	1.13	253.87	1.57	.05	240.42	5.74	.05	327.	349.
9.000	.218	.116	1.22	246.60	1.71	.24	233.58	5.14	-.26	309.	347.
10.000	.109	.056	1.21	238.97	1.80	.23	227.28	4.59	-.31	214.	344.
11.000	.046	.025	.84	230.96	1.73	.17	213.61	4.90	-.30	145.	341.
12.000	.016	.011	.79	223.12	1.52	.26	210.96	5.64	-.55	80.	339.
13.000	.008	.003	.62	215.71	1.38	.23	205.49	3.52	-1.08	51.	334.
14.000	.003	.001	.92	209.35	1.53	-.10	200.39	2.44	.13	47.	320.
15.000	99.999	99.999	999.99	204.92	1.95	.36	999.99	99.99	999.99	0.	308.
16.000	99.999	99.999	999.99	203.40	1.35	.33	999.99	99.99	999.99	0.	277.
17.000	99.999	99.999	999.99	204.16	1.83	.01	999.99	99.99	999.99	0.	265.
18.000	99.999	99.999	999.99	207.21	1.95	-.33	999.99	99.99	999.99	0.	265.
19.000	99.999	99.999	999.99	210.51	1.72	-.27	999.99	99.99	999.99	0.	255.
20.000	99.999	99.999	999.99	213.39	1.62	.19	999.99	99.99	999.99	0.	248.
21.000	99.999	99.999	999.99	216.19	1.72	.28	999.99	99.99	999.99	0.	245.
22.000	99.999	99.999	999.99	218.25	1.54	.37	999.99	99.99	999.99	0.	236.
23.000	99.999	99.999	999.99	220.13	1.53	.28	999.99	99.99	999.99	0.	224.
24.000	99.999	99.999	999.99	221.77	1.62	-.08	999.99	99.99	999.99	0.	224.
25.000	99.999	99.999	999.99	223.41	1.67	-.12	999.99	99.99	999.99	0.	212.
26.000	99.999	99.999	999.99	225.04	1.78	.25	999.99	99.99	999.99	0.	192.
27.000	99.999	99.999	999.99	226.76	1.98	.31	999.99	99.99	999.99	0.	182.
28.000	99.999	99.999	999.99	228.46	1.93	.30	999.99	99.99	999.99	0.	164.
29.000	99.999	99.999	999.99	230.11	2.28	.35	999.99	99.99	999.99	0.	116.
30.000	99.999	99.999	999.99	232.29	3.90	1.75	999.99	99.99	999.99	0.	114.

TABLE III-8. MOISTURE RELATED STATISTICAL PARAMETERS

AUGUST

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	23.695	4.946	-.03	307.51	6.97	.64	293.04	3.59	-.73	375.	375.
1.000	16.557	3.025	-.25	300.70	4.81	.61	287.45	3.01	-.87	375.	375.
1.246	15.156	2.785	-.23	299.06	4.31	.58	286.09	2.99	-.85	378.	378.
2.000	11.102	2.148	-.48	295.27	2.72	.08	281.39	3.13	-1.13	375.	378.
3.000	8.130	1.714	-.21	287.55	2.12	.08	278.85	3.20	-.71	375.	378.
4.000	5.417	1.361	-.18	279.77	1.68	-.09	271.08	3.79	-1.06	370.	376.
5.000	3.077	1.186	-.10	272.70	1.47	-.02	263.04	5.83	-.91	367.	375.
6.000	1.641	.801	.45	266.55	1.60	-.04	254.93	6.45	-.46	344.	372.
7.000	.830	.456	.95	260.39	1.64	-.26	247.10	6.10	-.02	327.	368.
8.000	.421	.241	1.21	253.66	1.77	-.40	239.94	5.59	.23	321.	367.
9.000	.209	.114	1.17	246.43	1.27	-.45	233.19	5.07	.02	308.	364.
10.000	.103	.054	1.02	238.85	1.96	-.30	226.68	4.53	.00	190.	362.
11.000	.043	.026	.96	230.94	1.99	-.19	218.70	5.35	-.32	121.	358.
12.000	.014	.010	1.16	223.12	1.86	.01	209.90	5.53	-.41	63.	355.
13.000	.007	.004	.67	215.87	1.70	.22	205.22	4.47	-1.16	41.	352.
14.000	.003	.001	1.19	209.68	1.57	.01	200.09	2.57	.59	34.	342.
15.000	99.999	99.999	999.99	205.09	1.81	.32	999.99	99.99	999.99	0.	334.
16.000	99.999	99.999	999.99	203.63	2.06	.18	999.99	99.99	999.99	0.	311.
17.000	99.999	99.999	999.99	204.68	2.33	.14	999.99	99.99	999.99	0.	299.
18.000	99.999	99.999	999.99	207.66	2.25	-.01	999.99	99.99	999.99	0.	299.
19.000	99.999	99.999	999.99	210.82	1.98	-.05	999.99	99.99	999.99	0.	289.
20.000	99.999	99.999	999.99	213.59	1.68	.10	999.99	99.99	999.99	0.	285.
21.000	99.999	99.999	999.99	215.89	1.62	.20	999.99	99.99	999.99	0.	281.
22.000	99.999	99.999	999.99	217.75	1.48	-.06	999.99	99.99	999.99	0.	278.
23.000	99.999	99.999	999.99	219.48	1.43	-.04	999.99	99.99	999.99	0.	257.
24.000	99.999	99.999	999.99	221.13	1.49	-.12	999.99	99.99	999.99	0.	257.
25.000	99.999	99.999	999.99	222.78	1.43	-.03	999.99	99.99	999.99	0.	241.
26.000	99.999	99.999	999.99	224.35	1.48	.10	999.99	99.99	999.99	0.	213.
27.000	99.999	99.999	999.99	225.98	1.81	-.02	999.99	99.99	999.99	0.	198.
28.000	99.999	99.999	999.99	227.51	1.65	.02	999.99	99.99	999.99	0.	182.
29.000	99.999	99.999	999.99	229.16	2.09	.08	999.99	99.99	999.99	0.	143.
30.000	99.999	99.999	999.99	230.75	3.33	.47	999.99	99.99	999.99	0.	113.

TABLE III-9. MOISTURE RELATED STATISTICAL PARAMETERS

SEPTEMBER

STATION = 722698 WHITE SAND MISSILE RANGE

Z	VAPOR P MEAN	S.O. VP	SKEW VP	TV MEAN	TV S.O.	SKEW TV	DEWPT T MEAN	S.O. DPT	SKEW DPT	NOBS T+P	NOBS TV
KM	MB	MB		DEG K	DEG K		DEG K	DEG K			
.000	18.979	7.252	.11	301.98	8.33	.14	288.62	6.93	-.88	370.	370.
1.000	13.611	4.491	-.10	296.28	5.85	.00	283.84	5.70	-.93	370.	370.
1.248	12.522	4.024	-.11	294.84	5.31	-.06	282.65	5.45	-.92	373.	373.
2.000	9.301	2.590	-.13	292.52	3.46	-.87	278.52	4.43	-.79	372.	373.
3.000	6.484	2.094	.04	285.08	2.73	-.67	273.25	4.97	-.77	370.	373.
4.000	4.168	1.691	.14	277.59	2.02	-.40	266.87	6.15	-.82	363.	371.
5.000	2.232	1.243	.48	270.97	2.02	-.58	258.16	7.55	-.34	353.	369.
6.000	1.151	.761	1.07	264.79	2.14	-.55	250.15	7.27	.26	325.	363.
7.000	.580	.381	1.54	258.10	2.39	-.59	242.95	6.29	.42	313.	362.
8.000	.313	.217	1.53	250.96	2.63	-.54	236.46	6.32	.28	315.	362.
9.000	.166	.114	1.58	243.52	2.77	-.46	230.48	5.94	.16	271.	360.
10.000	.085	.058	1.28	236.13	2.70	-.41	224.26	6.03	-.09	124.	359.
11.000	.027	.025	1.32	220.03	[illegible]	-.32	217.52	5.47	-.11	52.	355.
12.000	.010	.004	-.32	222.11	2.00	-.26	207.83	4.51	-1.64	41.	354.
13.000	.005	.002	.13	215.77	1.78	.06	203.34	3.83	-1.31	25.	351.
14.000	.003	.001	1.01	210.25	1.99	.21	199.34	1.87	.32	21.	346.
15.000	99.999	99.999	999.99	205.95	2.40	.27	999.99	99.99	999.99	1.	336.
16.000	99.999	99.999	999.99	204.15	2.56	.30	999.99	99.99	999.99	0.	310.
17.000	99.999	99.999	999.99	204.50	2.67	.20	999.99	99.99	999.99	0.	304.
18.000	99.999	99.999	999.99	207.19	2.65	.20	999.99	99.99	999.99	0.	299.
19.000	99.999	99.999	999.99	210.64	2.17	.11	999.99	99.99	999.99	0.	294.
20.000	99.999	99.999	999.99	213.22	1.88	-.18	999.99	99.99	999.99	0.	278.
21.000	99.999	99.999	999.99	215.32	1.56	-.12	999.99	99.99	999.99	0.	265.
22.000	99.999	99.999	999.99	217.27	1.55	.32	999.99	99.99	999.99	0.	265.
23.000	99.999	99.999	999.99	219.05	1.54	.17	999.99	99.99	999.99	0.	253.
24.000	99.999	99.999	999.99	220.76	1.71	.16	999.99	99.99	999.99	0.	253.
25.000	99.999	99.999	999.99	222.42	1.79	.60	999.99	99.99	999.99	0.	245.
26.000	99.999	99.999	999.99	224.04	1.82	.75	999.99	99.99	999.99	0.	227.
27.000	99.999	99.999	999.99	225.61	2.01	.58	999.99	99.99	999.99	0.	218.
28.000	99.999	99.999	999.99	226.90	2.03	.53	999.99	99.99	999.99	0.	211.
29.000	99.999	99.999	999.99	228.18	2.43	.49	999.99	99.99	999.99	0.	158.
30.000	99.999	99.999	999.99	230.54	3.39	.65	999.99	99.99	999.99	0.	152.

TABLE III-10. MOISTURE RELATED STATISTICAL PARAMETERS

OCTOBER

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	11.848	5.670	.71	294.15	9.90	.08	281.06	7.41	-.23	368.	388.
1.000	8.672	3.372	.67	289.50	6.91	.06	277.11	5.64	-.12	366.	388.
1.246	8.030	2.984	.67	288.44	6.30	.07	276.11	5.32	-.10	374.	374.
2.000	6.070	2.252	.45	287.24	4.23	-.72	272.15	5.55	-.77	372.	374.
3.000	4.179	1.824	.66	280.31	3.58	-1.08	266.91	5.94	-.24	368.	373.
4.000	2.473	1.341	.97	273.78	3.05	-1.09	259.79	6.60	.08	348.	371.
5.000	1.269	.784	1.57	267.58	3.01	-.70	251.71	6.42	.34	341.	369.
6.000	.654	.380	1.97	260.98	3.00	-.69	244.70	5.39	.50	327.	365.
7.000	.355	.209	2.20	253.79	2.87	-.65	238.40	5.00	.58	319.	363.
8.000	.186	.110	2.09	246.34	2.8[illegible]	-.28	232.10	4.79	.51	317.	363.
9.000	.099	.050	1.9[illegible]	[illegible]	2.95	-.01	224.84	5.95	-.20	242.	359.
10.000	.041	.029	1.63	231.28	2.88	.29	218.10	5.68	-.24	94.	353.
11.000	.017	.008	.97	224.43	2.72	.23	212.36	3.10	.44	19.	345.
12.000	.009	.004	.49	218.68	2.84	-.17	207.16	3.85	-.60	19.	345.
13.000	.005	.002	.44	214.00	2.96	-.26	204.08	2.25	.01	16.	337.
14.000	.003	.001	.13	210.23	3.00	-.40	200.30	2.06	-.31	17.	334.
15.000	.002	.000	-.26	207.42	2.93	-.04	197.57	1.65	-.93	16.	332.
16.000	99.999	99.999	999.99	206.11	2.96	.10	999.99	99.99	999.99	0.	310.
17.000	99.999	99.999	999.99	206.08	2.99	.05	999.99	99.99	999.99	0.	299.
18.000	99.999	99.999	999.99	207.50	2.95	.30	999.99	99.99	999.99	0.	296.
19.000	99.999	99.999	999.99	210.23	2.70	.44	999.99	99.99	999.99	0.	290.
20.000	99.999	99.999	999.99	212.57	2.33	.12	999.99	99.99	999.99	0.	277.
21.000	99.999	99.999	999.99	214.37	1.99	.02	999.99	99.99	999.99	0.	267.
22.000	99.999	99.999	999.99	215.66	1.91	.14	999.99	99.99	999.99	0.	266.
23.000	99.999	99.999	999.99	217.57	1.81	.19	999.99	99.99	999.99	0.	251.
24.000	99.999	99.999	999.99	219.25	1.95	.08	999.99	99.99	999.99	0.	246.
25.000	99.999	99.999	999.99	220.84	2.10	.22	999.99	99.99	999.99	0.	236.
26.000	99.999	99.999	999.99	222.19	2.17	.09	999.99	99.99	999.99	0.	224.
27.000	99.999	99.999	999.99	223.37	2.27	.02	999.99	99.99	999.99	0.	207.
28.000	99.999	99.999	999.99	224.51	2.44	.15	999.99	99.99	999.99	0.	207.
29.000	99.999	99.999	999.99	225.81	2.70	.33	999.99	99.99	999.99	0.	160.
30.000	99.999	99.999	999.99	228.45	3.47	.65	999.99	99.99	999.99	0.	144.

TABLE III-11. MOISTURE RELATED STATISTICAL PARAMETERS

NOVEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z	VAPOR P MEAN	S.D. VP	SKEW VP	TV MEAN	TV S.D.	SKEW TV	DEWPT T MEAN	S.D. DPT	SKEW DPT	NOBS T+P	NOBS TV
KM	MB	MB		DEG K	DEG K		DEG K	DEG K			
.000	7.413	4.124	.76	285.10	9.73	-.01	273.78	8.40	-.38	379.	379.
1.000	5.756	2.447	.65	282.16	6.53	.15	271.21	6.03	-.30	379.	379.
1.246	5.429	2.135	.61	281.54	5.92	.19	270.59	5.53	-.30	393.	393.
2.000	4.319	1.590	.71	281.76	4.68	-.39	267.68	4.96	-.23	393.	393.
3.000	2.796	1.164	.79	276.31	4.60	-.71	261.90	5.37	-.29	379.	392.
4.000	1.617	.803	1.24	270.98	4.52	-.84	255.00	5.62	.10	371.	391.
5.000	.929	.492	1.33	264.84	4.36	-.84	248.48	5.90	-.33	373.	390.
6.000	.536	.284	1.59	257.86	4.18	-.71	242.62	5.49	-.29	363.	381.
7.000	.313	.172	1.39	250.74	3.95	-.74	237.08	5.30	-.03	356.	375.
8.000	.170	.097	1.61	243.66	3.70	-.54	231.15	5.07	-.01	339.	374.
9.000	.085	.049	.99	236.37	3.37	-.22	224.60	5.46	-.33	230.	370.
10.000	.032	.022	1.37	229.08	3.07	-.06	216.17	5.65	-.24	79.	366.
11.000	.015	.005	[illegible]	[illegible]	2.75	.33	[illegible]	3.15	-.03	11.	353.
12.000	.007	.004	-.06	216.85	3.16	.38	204.10	6.88	-1.13	11.	351.
13.000	.005	.002	.40	212.62	3.64	.16	203.47	2.91	.05	9.	339.
14.000	.003	.001	.40	209.78	3.54	-.01	200.42	2.82	.15	8.	322.
15.000	.002	.001	.18	207.51	3.50	.05	197.93	1.56	.09	6.	311.
16.000	99.999	99.999	999.99	206.30	3.38	.22	999.99	99.99	999.99	0.	279.
17.000	99.999	99.999	999.99	205.85	3.22	.33	999.99	99.99	999.99	0.	265.
18.000	99.999	99.999	999.99	206.32	3.02	.29	999.99	99.99	999.99	0.	255.
19.000	99.999	99.999	999.99	208.11	2.22	-.01	999.99	99.99	999.99	0.	248.
20.000	99.999	99.999	999.99	210.12	1.99	.14	999.99	99.99	999.99	0.	243.
21.000	99.999	99.999	999.99	211.92	2.10	.07	999.99	99.99	999.99	0.	234.
22.000	99.999	99.999	999.99	213.47	2.25	.23	999.99	99.99	999.99	0.	227.
23.000	99.999	99.999	999.99	215.03	2.26	.21	999.99	99.99	999.99	0.	217.
24.000	99.999	99.999	999.99	216.58	2.49	.04	999.99	99.99	999.99	0.	208.
25.000	99.999	99.999	999.99	217.74	2.60	-.04	999.99	99.99	999.99	0.	204.
26.000	99.999	99.999	999.99	219.07	2.69	-.02	999.99	99.99	999.99	0.	199.
27.000	99.999	99.999	999.99	220.64	2.69	-.01	999.99	99.99	999.99	0.	171.
28.000	99.999	99.999	999.99	222.05	2.89	.16	999.99	99.99	999.99	0.	171.
29.000	99.999	99.999	999.99	223.82	2.97	.52	999.99	99.99	999.99	0.	103.
30.000	99.999	99.999	999.99	225.31	4.47	.09	999.99	99.99	999.99	0.	144.

TABLE III-12. MOISTURE RELATED STATISTICAL PARAMETERS

DECEMBER

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	5.915	3.410	.89	279.54	9.48	.20	270.62	8.27	-.23	314.	314.
1.000	4.808	2.019	.59	277.50	6.20	.37	268.81	5.91	-.35	314.	314.
1.246	4.593	1.797	.48	277.05	5.54	.40	268.34	5.52	-.41	321.	321.
2.000	3.570	1.321	.77	278.22	4.63	-.44	265.20	4.93	-.37	319.	320.
3.000	2.387	1.255	1.07	273.37	4.72	-.49	259.42	6.57	-.22	314.	319.
4.000	1.449	.867	1.38	268.16	4.54	-.62	253.24	6.55	.17	305.	319.
5.000	.868	.562	1.82	262.07	4.36	-.59	247.34	6.50	.10	301.	317.
6.000	.496	.317	1.89	255.23	4.12	-.75	241.47	5.99	.11	296.	316.
7.000	.276	.181	1.61	248.01	4.07	-.72	235.40	5.97	.19	292.	315.
8.000	.149	.100	1.28	240.86	3.89	-.70	229.36	6.09	.01	269.	310.
9.000	.073	.053	.85	233.81	3.53	-.37	222.24	7.24	-.33	180.	308.
10.000	.032	.020	.43	226.81	3.03	.15	216.06	6.02	-.56	60.	303.
11.000	.015	.006	.69	220.83	3.13	.98	211.52	3.08	-.02	14.	287.
12.000	.006	.004	.06	215.79	4.19	.75	203.11	7.24	-.62	14.	283.
13.000	.006	.003	.75	213.11	4.52	.26	204.81	3.59	.15	9.	264.
14.000	.004	.002	1.43	211.63	3.66	20	202.12	3.44	.21	9.	243.
15.000	99.999	99.999	999.99	209.52	3.12	.42	999.99	99.99	999.99	3.	222.
16.000	99.999	99.999	999.99	208.05	3.12	.18	999.99	99.99	999.99	0.	206.
17.000	99.999	99.999	999.99	207.32	3.27	.15	999.99	99.99	999.99	0.	192.
18.000	99.999	99.999	999.99	207.35	3.41	.00	999.99	99.99	999.99	0.	191.
19.000	99.999	99.999	999.99	208.15	3.06	-.05	999.99	99.99	999.99	0.	185.
20.000	99.999	99.999	999.99	209.68	2.68	-.18	999.99	99.99	999.99	0.	176.
21.000	99.999	99.999	999.99	211.31	2.50	-.01	999.99	99.99	999.99	0.	173.
22.000	99.999	99.999	999.99	212.65	2.49	-.02	999.99	99.99	999.99	0.	170.
23.000	99.999	99.999	999.99	214.22	2.24	-.01	999.99	99.99	999.99	0.	168.
24.000	99.999	99.999	999.99	215.75	2.29	.11	999.99	99.99	999.99	0.	156.
25.000	99.999	99.999	999.99	217.21	2.55	.31	999.99	99.99	999.99	0.	144.
26.000	99.999	99.999	999.99	218.51	2.90	.54	999.99	99.99	999.99	0.	144.
27.000	99.999	99.999	999.99	219.93	3.12	.71	999.99	99.99	999.99	0.	128.
28.000	99.999	99.999	999.99	221.35	3.20	.60	999.99	99.99	999.99	0.	128.
29.000	99.999	99.999	999.99	222.22	2.66	.71	999.99	99.99	999.99	0.	73.
30.000	99.999	99.999	999.99	224.43	4.53	.42	999.99	99.99	999.99	0.	153.

TABLE III-13. MOISTURE RELATED STATISTICAL PARAMETERS

ANNUAL

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	VAPOR P MEAN MB	S.D. VP MB	SKEW VP	TV MEAN DEG K	TV S.D. DEG K	SKEW TV	DEWPT T MEAN DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	12.246	8.107	.95	295.30	13.77	-.19	280.00	10.61	-.24	4493.	4493.
1.000	8.675	5.329	.89	290.04	10.82	-.14	275.66	8.98	-.04	4493.	4493.
1.246	7.882	4.816	.92	288.74	10.18	-.13	274.39	8.71	.02	4637.	4638.
2.000	6.037	3.417	.78	286.72	8.12	-.31	271.00	7.99	-.11	4555.	4632.
3.000	4.183	2.590	.87	279.73	7.24	-.37	265.78	8.38	-.09	4501.	4625.
4.000	2.655	1.858	.97	272.82	6.38	-.50	259.44	9.03	-.06	4384.	4598.
5.000	1.542	1.206	1.24	265.99	5.99	-.59	252.57	9.06	.10	4281.	4564.
6.000	.826	.701	1.72	259.12	6.11	-.48	245.55	8.42	.28	4125.	4516.
7.000	.424	.357	2.11	252.15	6.35	-.30	238.82	7.58	.27	4016.	4477.
8.000	.221	.184	2.21	244.97	6.42	-.15	232.48	7.21	.02	3778.	4446.
9.000	.116	.097	1.90	237.65	6.25	.03	226.13	7.68	-.29	2887.	[illegible]
10.000	.062	.052	1.61	230.49	5.84	.17	220.65	7.44	-.29	1303.	4322.
11.000	.034	.024	1.48	224.01	5.03	.17	216.77	5.37	.14	520.	4195.
12.000	.012	.008	1.92	218.44	4.50	-.22	208.38	5.42	-.79	377.	4154.
13.000	.007	.003	2.29	214.54	3.72	-.23	205.28	2.90	3.66	277.	4026.
14.000	.004	.002	2.41	211.52	3.47	.26	201.78	3.20	1.24	254.	[illegible]
15.000	.004	.002	.91	208.75	3.90	.24	201.24	3.40	-.05	83.	3710.
16.000	99.999	99.999	999.99	207.16	3.89	.22	999.99	99.99	999.99	0.	3444.
17.000	99.999	99.999	999.99	206.82	3.52	.22	999.99	99.99	999.99	0.	3270.
18.000	99.999	99.999	999.99	207.91	3.11	.00	999.99	99.99	999.99	0.	3210.
19.000	99.999	99.999	999.99	209.98	2.78	-.41	999.99	99.99	999.99	0.	3098.
20.000	99.999	99.999	999.99	212.14	2.70	-.61	999.99	99.99	999.99	0.	3011.
21.000	99.999	99.999	999.99	214.16	2.84	-.58	999.99	99.99	999.99	0.	2908.
22.000	99.999	99.999	999.99	215.93	2.96	-.59	999.99	99.99	999.99	0.	2845.
23.000	99.999	99.999	999.99	217.61	3.00	-.58	999.99	99.99	999.99	0.	2709.
24.000	99.999	99.999	999.99	219.34	3.16	-.60	999.99	99.99	999.99	0.	2643.
25.000	99.999	99.999	999.99	220.96	3.26	-.58	999.99	99.99	999.99	0.	2514.
26.000	99.999	99.999	999.99	222.46	3.43	-.53	999.99	99.99	999.99	0.	2374.
27.000	99.999	99.999	999.99	224.11	3.56	-.43	999.99	99.99	999.99	0.	2146.
28.000	99.999	99.999	999.99	225.64	3.67	-.44	999.99	99.99	999.99	0.	2089.
29.000	99.999	99.999	999.99	227.35	3.72	-.26	999.99	99.99	999.99	0.	1465.
30.000	99.999	99.999	999.99	228.65	4.74	-.13	999.99	99.99	999.99	0.	1696.

TABLE IV-1. HYDROSTATIC MODEL ATMOSPHERE

JANUARY

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1021.6000	1268.0000	281.09
1.000	.999	904.2800	1132.0000	278.36
1.246	1.244	877.3600	1102.0000	277.47
2.000	1.997	789.7900	1002.0000	278.16
3.000	2.995	706.7100	901.8000	273.00
4.000	3.993	622.9700	811.1000	267.55
5.000	4.990	547.6400	730.3000	261.25
6.000	5.988	479.8400	657.4000	254.27
7.000	6.984	418.8600	591.3000	246.79
8.000	7.981	364.1100	530.1000	239.28
9.000	8.977	315.1200	473.6000	231.77
10.000	9.973	271.4900	420.7000	224.80
11.000	10.966	232.9400	369.3000	219.39
12.000	11.964	199.2200	322.1000	215.43
13.000	12.959	170.0500	276.9000	213.97
14.000	13.953	145.0000	237.7000	212.47
15.000	14.948	123.4600	204.7000	210.13
16.000	15.942	104.9500	175.9000	207.78
17.000	16.935	89.0900	150.1000	206.75
18.000	17.929	75.6050	127.4000	206.79
19.000	18.922	64.1930	107.6000	207.88
20.000	19.915	54.5590	90.8300	209.26
21.000	20.907	46.4250	76.7400	210.75
22.000	21.899	39.5530	64.8700	212.42
23.000	22.891	33.7390	54.9700	213.82
24.000	23.882	28.8110	46.6300	215.26
25.000	24.874	24.6330	39.5400	217.02
26.000	25.865	21.0870	33.6200	218.50
27.000	26.855	18.0710	28.6100	220.08
28.000	27.845	15.5040	24.3700	221.62
29.000	28.835	13.3155	20.8100	222.90
30.000	29.825	11.4557	17.9000	226.70
32.000	31.802	8.5214	13.0800	229.79
34.000	33.779	6.3595	9.5910	234.28
36.000	35.755	4.7921	7.0380	240.18
38.000	37.729	3.6316	5.2030	246.21
40.000	39.703	2.7712	3.8700	252.62
42.000	41.675	2.1294	2.9030	258.78
44.000	43.646	1.6461	2.1960	264.41
46.000	45.615	1.2782	1.6860	267.40
48.000	47.584	.9941	1.3100	267.75
50.000	49.551	.7727	1.0260	265.62
52.000	51.517	.5989	.8077	261.53
54.000	53.482	.4626	.6316	258.34
56.000	55.445	.3562	.4924	255.17
58.000	57.407	.2737	.3814	253.09
60.000	59.368	.2098	.2949	250.84
62.000	61.328	.1604	.2281	247.98
64.000	63.287	.1223	.1759	245.12
66.000	65.244	.0930	.1348	243.18
68.000	67.200	.0706	.1032	241.19
70.000	69.155	.0533	.0802	234.11

TABLE IV-2. HYDROSTATIC MODEL ATMOSPHERE

FEBRUARY

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1018.5000	1247.0000	284.97
1.000	.999	902.7000	1121.0000	280.49
1.246	1.244	876.0500	1092.0000	279.37
2.000	1.997	798.8100	1001.0000	277.91
3.000	2.995	705.5800	905.0000	271.62
4.000	3.993	621.4800	815.3000	265.54
5.000	4.990	545.7800	733.8000	259.12
6.000	5.988	477.6800	660.1000	252.09
7.000	6.984	416.5100	592.4000	244.93
8.000	7.981	361.7000	530.2000	237.67
9.000	8.977	312.7700	472.4000	230.66
10.000	9.973	269.3400	418.0000	224.48
11.000	10.968	231.1300	365.7000	220.17
12.000	11.964	197.8800	316.8000	217.63
13.000	12.959	169.2000	272.3000	216.45
14.000	13.953	144.5000	235.0000	214.24
15.000	14.948	123.1900	202.8000	211.64
16.000	15.942	104.8300	174.5000	209.26
17.000	16.935	89.0920	149.2000	208.01
18.000	17.929	75.6770	126.8000	207.89
19.000	18.922	64.3080	107.2000	208.95
20.000	19.915	54.7060	90.5400	210.50
21.000	20.907	46.5950	76.5500	212.03
22.000	21.899	39.7350	64.8100	213.60
23.000	22.891	33.9240	54.9600	215.03
24.000	23.882	28.9960	46.6400	216.56
25.000	24.874	24.8130	39.6100	218.22
26.000	25.865	21.2590	33.7000	219.75
27.000	26 855	18.2360	28.6900	221.42
28.000	27.845	15.6610	24.4500	223.16
29.000	28.835	13.4666	20.8600	224.90
30.000	[illegible]	[illegible]	[illegible]	[illegible]
32.000	31.802	8.6446	12.9200	232.98
34.000	33.779	6.4915	9.4770	238.59
36.000	35.755	4.9105	6.9780	245.11
38.000	37.729	3.7424	5.1860	251.35
40.000	39.703	2.8696	3.8960	256.56
42.000	41.675	2.2128	2.9440	261.78
44.000	43.646	1.7135	2.2530	264.93
46.000	45.615	1.3301	1.7400	266.18
48.000	47.584	1.0329	1.3540	265.81
50.000	49.551	.8016	1.0570	264.18
52.000	51.517	.6211	.8245	262.37
54.000	53.482	.4803	.6434	260.02
56.000	55.445	.3707	.5010	257.68
58.000	57.407	.2855	.3887	255.87
60.000	59.368	.2195	.3011	253.91
62.000	61.328	.1685	.2331	251.70
64.000	63.287	.1290	.1801	249.46
66.000	65.244	.0985	.1389	247.05
68.000	67.200	.0750	.1076	242.69
70.000	69.155	.0568	.0830	238.44

TABLE IV-3. HYDROSTATIC MODEL ATMOSPHERE

MARCH

STATION = 722698 · WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1015.2000	1227.0000	288.57
1.000	.999	901.0300	1108.0000	283.34
1.246	1.244	874.6900	1080.0000	282.26
2.000	1.997	798.2400	992.8000	280.10
3.000	2.995	705.6600	900.2000	273.09
4.000	3.993	621.8700	813.7000	266.23
5.000	4.990	546.2500	733.4000	259.46
6.000	5.988	478.1800	659.9000	252.45
7.000	6.984	417.0100	592.6000	245.16
8.000	7.981	362.1900	530.2000	237.97
9.000	8.977	313.2500	472.6000	230.91
10.000	9.973	269.7700	418.7000	224.46
11.000	10.968	231.4600	367.1000	[illegible]
12.000	11.964	198.0300	319.0000	216.26
13.000	12.959	169.1500	274.0000	215.10
[illegible].000	13.953	144.3700	235.2000	213.80
15.000	14.948	123.0600	202.5000	211.69
16.000	15.942	104.7600	173.7000	210.11
17.000	16.935	89.1060	148.2000	209.42
18.000	17.929	75.7750	126.1000	209.40
19.000	18.922	64.4650	106.8000	210.35
20.000	19.915	54.8960	90.2800	211.82
21.000	20.907	46.8070	76.3600	213.55
22.000	21.899	39.9610	64.6900	215.20
23.000	22.891	34.1600	54.8700	216.86
24.000	23.882	29.2380	46.6000	218.57
25.000	24.874	25.0570	39.6300	220.26
26.000	25.865	21.4990	33.7700	221.81
27.000	26.855	18.4670	28.7800	223.50
28.000	27.845	15.8830	24.5600	225.28
29.000	28.835	13.6790	20.9500	227.50
30.000	29.825	11.7950	17.9700	228.96
32.000	31.802	8.8123	13.1000	234.38
34.000	33.779	6.6282	9.6250	239.89
36.000	35.755	5.0172	7.1360	244.95
38.000	37.729	3.8204	5.3240	249.96
40.000	39.703	2.9249	3.9960	254.97
42.000	41.675	2.2517	3.0160	260.10
44.000	43.646	1.7406	2.3060	262.98
46.000	45.615	1.3489	1.7750	264.79
48.000	47.584	1.0470	1.3710	266.08
50.000	49.551	.8134	1.0640	266.30
52.000	51.517	.6318	.8295	265.30
54.000	53.482	.4901	.6483	263.33
56.000	55.445	.3796	.5056	261.50
58.000	57.407	.2935	.3937	259.66
60.000	59.368	.2263	.3082	255.77
62.000	61.328	.1738	.2408	251.39
64.000	63.287	.1329	.1866	248.23
66.000	65.244	.1014	.1435	246.20
68.000	67.200	.0772	.1106	243.06
70.000	69.155	.0584	.0864	235.35

TABLE IV-4. HYDROSTATIC MODEL ATMOSPHERE

APRIL

STATION • 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1011.0000	1191.0000	296.18
1.000	.999	899.8800	1082.0000	299.71
1.246	1.244	874.1200	1056.0000	288.24
2.000	1.997	799.1200	976.4000	285.12
3.000	2.995	707.8300	890.0000	277.07
4.000	3.993	624.8700	806.8000	269.81
5.000	4.990	549.8300	728.7000	262.86
6.000	5.988	482.1500	656.5000	255.84
7.000	6.984	421.2500	590.4000	248.56
8.000	7.981	366.5800	529.3000	241.26
9.000	8.977	317.0700	[illegible]	[illegible]
10.000	9.973	274.0600	420.8000	226.87
11.000	10.968	235.4100	371.8000	220.57
12.000	11.964	201.4100	325.7000	215.45
13.000	12.959	171.9200	279.9000	213.96
14.000	13.953	146.6500	239.3000	213.52
15.000	14.948	125.0200	205.4000	212.07
16.000	15.942	106.4700	176.0000	210.76
17.000	16.935	90.5970	150.4000	209.92
18.000	17.929	77.0670	128.0000	209.72
19.000	18.922	65.5790	108.5000	210.62
20.000	19.915	55.8660	91.5800	212.51
21.000	20.907	47.6600	77.4600	214.34
22.000	21.899	40.7160	65.6200	216.16
23.000	22.891	34.8310	55.6000	217.91
24.000	23.882	29.8350	47.3200	219.63
25.000	24.874	25.5850	40.3100	221.10
26.000	25.865	21.9630	34.3900	222.50
27.000	26.855	18.8760	29.3100	224.32
28.000	27.845	16.2450	24.9900	226.43
29.000	28.835	13.9992	21.3700	228.18
30.000	29.825	12.0799	18.2700	230.54
32.000	31.802	9.0420	13.3600	235.78
34.000	33.779	6.8126	9.8320	241.36
36.000	35.755	5.1654	7.3020	246.40
38.000	37.729	3.9393	5.4600	251.32
40.000	39.703	3.0214	4.0940	257.06
42.000	41.675	2.3308	3.0970	262.18
44.000	43.646	1.8067	2.3610	266.55
46.000	45.615	1.4055	1.8190	269.14
48.000	47.584	1.0955	1.4100	270.67
50.000	49.551	.8542	1.1030	269.69
52.000	51.517	.6655	.8644	268.14
54.000	53.482	.5175	.6780	265.88
56.000	55.445	.4015	.5327	262.52
58.000	57.407	.3106	.4164	259.83
60.000	59.368	.2396	.3254	256.49
62.000	61.328	.1843	.2536	253.09
64.000	63.287	.1411	.1979	248.27
66.000	65.244	.1076	.1532	244.49
68.000	67.200	.0816	.1187	239.35
70.000	69.155	.0616	.0914	234.50

TABLE IV-5. HYDROSTATIC MODEL ATMOSPHERE

MAY

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1008.0000	1157.0000	303.86
1.000	.999	899.7200	1057.0000	296.68
1.248	1.244	874.5800	1033.0000	294.92
2.000	1.997	801.1000	958.7000	291.11
3.000	2.995	711.3300	876.6000	282.70
4.000	3.993	629.4100	798.8000	274.49
5.000	4.990	554.9300	725.0000	266.65
6.000	5.988	487.5000	655.0000	259.28
7.000	6.984	426.6900	590.1000	251.89
8.000	7.981	371.9800	[illegible]0.3000	244.35
9.000	8.977	322.9000	[illegible]5.2000	235.72
10.000	9.973	279.0200	424.2000	229.14
11.000	10.968	239.9800	376.3000	222.15
12.000	11.964	205.5100	330.9000	216.32
13.000	12.959	175.4300	286.6000	213.27
14.000	13.953	149.5500	245.1000	212.57
15.000	14.948	127.4100	209.9000	211.45
16.000	15.942	108.4500	179.9000	210.03
17.000	16.935	92.2280	153.7000	209.03
18.000	17.929	78.4040	130.7000	208.94
19.000	18.922	66.6980	110.3000	210.69
20.000	19.915	56.8320	92.9200	213.06
21.000	20.907	48.5130	78.4700	215.37
22.000	21.899	41.4770	66.5200	217.22
23.000	22.891	35.5100	56.4700	219.08
24.000	23.882	30.4430	48.0000	220.93
25.000	24.874	26.1330	40.8700	222.73
26.000	25.865	22.4620	34.8400	224.58
27.000	26.855	19.3320	29.7600	226.33
28.000	27.845	16.6580	25.4300	228.19
29.000	28.835	14.3717	21.7700	229.99
30.000	29.825	12.4133	18.5700	231.75
32.000	31.802	9.3018	13.6300	236.36
34.000	33.779	7.0102	10.0700	241.19
36.000	35.755	5.3132	7.4830	245.92
38.000	37.729	4.0523	5.5710	251.90
40.000	39.703	3.1102	4.1780	257.83
42.000	41.675	2.4019	3.1570	263.52
44.000	43.646	1.8644	2.4090	268.08
46.000	45.615	1.4525	1.8580	270.76
48.000	47.584	1.1333	1.4460	271.51
50.000	49.551	.8847	1.1300	271.17
52.000	51.517	.6902	.8859	269.81
54.000	53.482	.5374	.6982	266.54
56.000	55.445	.4172	.5485	263.41
58.000	57.407	.3229	.4305	259.75
60.000	59.368	.2490	.3374	255.52
62.000	61.328	.1911	.2638	250.87
64.000	63.287	.1459	.2066	244.48
66.000	65.244	.1106	.1607	238.21
68.000	67.200	.0832	.1247	230.97
70.000	69.155	.0619	.0966	221.93

TABLE IV-6. HYDROSTATIC MODEL ATMOSPHERE

JUNE

STATION • 722696 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1006.3000	1143.0000	307.05
1.000	.999	899.3800	1043.0000	300.31
1.246	1.244	874.5300	1020 0000	299.72
2.000	1.997	802.0000	946.0000	295.35
3.000	2.995	713.4000	865.3000	287.21
4.000	3.993	632.4800	789.7000	279.02
5.000	4.990	558.7700	718.4000	270.97
6.000	5.988	49[illegible]100	650.0000	2[illegible]3.62
7.000	6.984	43[illegible].5600	585.6000	2[illegible].73
8.000	7.981	377.2500	526.7000	249.49
9.000	8.977	328.4600	473.1000	241.86
10.000	9.973	284.7000	423.5000	234.20
11.000	10.968	245.6400	377.4000	226.73
12.000	11.964	210.9600	334.0000	220.05
13.000	12.959	180.4300	292.6000	214.78
14.000	13.953	153.8100	253.9000	211.06
15.000	14.948	130.8000	218.9000	208.14
16.000	15.942	111.0300	187.4000	206.43
17.000	16.935	94.1910	159.1000	206.27
18.000	17.929	79.9620	133.8000	208.19
19.000	18.922	68.0160	112.2000	211.14
20.000	19.915	57.9790	94.5200	213.70
21.000	20.907	49.5160	79.8400	216.07
22.000	21.899	42.3560	67.6900	217.99
23.000	22.891	36.2840	57.4700	219.94
24.000	23.882	31.1250	48.8800	221.85
25.000	24.874	26.7360	41.6400	223.68
26.000	25.865	22.9950	35.5200	225.52
27.000	26.855	19.8030	30.3500	227.32
28.000	27.845	17.0730	[illegible]5.9900	228.81
29.000	28.835	14.7342	22.2900	230.31
30.000	29.825	12.7295	19.0600	232.19
32.000	31.802	9.5450	13.9600	236.98
34.000	33.779	7.1969	10 3500	241.39
36.000	35.755	5.4565	7.6900	246.30
38.000	37.729	4.1622	5.7370	251.80
40.000	39.703	3.1944	4.3000	257.84
42.000	41.675	2.4665	3.2530	263.20
44.000	43.848	1.8137	2.4040	267.47
46.000	45.815	1.4899	1.9160	269.90
48.000	47.584	1.1620	1.4870	271.33
50.000	49.551	.9070	1.1610	271.25
52.000	51.517	.7074	.9127	269.02
54.000	53.482	.5505	.7175	266.29
56.000	55.445	.4271	.5654	262.18
58.000	57.407	.3301	.4435	258.32
60.000	59.368	.2541	.3475	253.84
62.000	61.328	.1947	.2719	248.44
64.000	63.287	.1482	.2119	242.73
66.000	65.244	.1121	.1644	236.70
68.000	67.200	.0844	.1259	232.58
70.000	69.155	.0629	.0982	222.16

TABLE IV-7. HYDROSTATIC MODEL ATMOSPHERE

JULY

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1009.2000	1139.0000	308.77
1.000	.999	902.5300	1041.0000	301.91
1.246	1.244	877.7200	1018.0000	300.24
2.000	1.997	805.2100	946.7000	295.29
3.000	2.995	716.6000	864.9000	288.64
4.000	3.993	635.7400	788.8000	280.79
5.000	4.990	562.1700	716.4000	273.36
6.000	5.988	495.5500	647.2000	266.73
7.000	6.984	435.5000	582.3000	260.56
8.000	7.981	381.5100	523.5000	253.87
9.000	8.977	333.0000	470.4000	246.60
10.000	9.973	283.4500	422.0000	238.97
11.000	10.968	250.4500	377.8[illegible]	[illegible]
12.000	11.964	215.6100	336.6000	223.12
13.000	12.959	184.6700	298.2000	215.71
14.000	13.953	157.3800	261.9000	209.35
15.000	14.948	133.5800	227.1000	204.92
16.000	15.942	113.1100	193.7000	203.40
17.000	16.935	95.7530	163.4000	204.16
18.000	17.929	81.1890	136.5000	207.21
19.000	18.922	69.0160	114.2000	210.51
20.000	19.915	58.8110	96.0100	213.39
21.000	20.907	50.2230	80.9300	216.19
22.000	21.899	42.9670	68.5800	218.25
23.000	22.891	36.8130	58.2600	220.13
24.000	23.882	31.5000	49.6100	221.77
25.000	24.874	27.1240	42.3000	223.41
26.000	25.865	23.3230	36.1000	225.04
27.000	26.855	20.0780	30.8500	226.76
28.000	27.845	17.3050	26.3900	228.46
29.000	28.835	14.9318	22.6100	230.11
30.000	29.825	12.8998	19.2500	232.29
32.000	31.802	9.6672	14.1700	235.95
34.000	33.779	7.2774	10.5000	239.72
36.000	35.755	5.5051	7.8050	244.00
38.000	37.729	4.1881	5.8120	249.27
40.000	39.703	3.2054	4.3470	255.09
42.000	41.675	2.4674	3.2850	259.85
44.000	43.646	1.9082	2.4990	264.10
46.000	45.615	1.4812	1.9190	266.94
48.000	47.584	1.1520	1.4850	268.29
50.000	49.551	.8963	1.1610	267.14
52.000	51.517	.6963	.9096	264.79
54.000	53.482	.5395	.7131	261.73
56.000	55.445	.4169	.5580	258.44
58.000	57.407	.3210	.4368	254.16
60.000	59.368	.2459	3416	249.03
62.000	61.328	.1874	2661	243.61
64.000	63.287	.1420	.2056	238.97
66.000	65.244	.1070	.1584	233.77
68.000	67.200	.0803	.[illegible]98	232.01
70.000	69.155	.0600	.0920	225.60

TABLE IV-8. HYDROSTATIC MODEL ATMOSPHERE

AUGUST

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1009.6000	1144.0000	307.51
1.000	.999	902.4600	1046.0000	300.70
1.246	1.244	877.5500	1022.0000	299.05
2.000	1.997	804.8000	949.5000	295.27
3.000	2.995	715.9300	867.4000	287.55
4.000	3.993	634.8700	790.5000	279.77
5.000	4.990	561.1900	716.9000	272.70
6.000	5.988	494.5800	646.4000	266.55
7.000	6.984	434.6200	581.5000	260.39
8.000	7.981	380.7000	522.8000	253.66
9.000	8.977	332.3500	469.7000	246.43
10.000	9.973	288.7800	421.2000	238.85
11.000	10.368	249.8600	376.9000	230.94
12.000	11.964	215.1000	335.8000	223.12
13.000	12.959	184.2400	297.3000	215.87
14.000	13.953	157.0500	260.9000	209.68
15.000	14.948	.33.3200	226.5000	205.09
16.000	15.942	112.9100	193.2000	203.63
17.000	16.935	95.6140	162.7000	204.62
18.000	17.929	81.1020	136.1000	207.66
19.000	18.922	68.9630	114.0000	210.82
20.000	19.915	58.7770	95.0700	213.59
21.000	20.907	50.1920	80.9900	215.88
22.000	21.899	42.9280	68.6800	217.75
23.000	22.891	36.7650	58.3600	219.48
24.000	23.882	31.5250	49.6600	221.13
25.000	24.874	27.0640	42.3200	222.78
26.000	25.865	23.2610	36.1200	224.35
27.000	26.855	20.0150	30.8600	225.98
28.000	27.845	17.2410	26.4000	227.51
29.000	28.835	14.8674	22.6000	229.16
30.000	29.825	12.8324	19.2200	230.38
32.000	31.802	9.5960	14.1100	234.41
34.000	33.779	7.2102	10.4400	238.14
36.000	35.755	5.4426	7.7550	241.90
38.000	37.729	4.1300	5.7670	246.81
40.000	39.703	3.1523	4.3040	252.42
42.000	41.675	2.4199	3.2420	257.22
44.000	43.646	1.8675	2.4530	262.42
46.000	45.615	1.4466	1.8840	264.62
48.000	47.584	1.1225	1.4570	265.43
50.000	49.551	.8712	1.1330	264.89
52.000	51.517	.6757	.8828	263.81
54.000	53.482	.5233	.6902	261.29
56.000	55.445	.4042	.5398	258.03
58.000	57.407	.3112	.4209	254.78
60.000	59.368	.2387	.3286	250.35
62.000	61.328	.1822	.2557	245.58
64.000	63.287	.1384	.1974	241.66
66.000	65.244	.1047	.1519	237.53
68.000	67.200	.0788	.1165	233.12
70.000	69.155	.0591	.0888	229.29

TABLE IV-9. HYDROSTATIC MODEL ATMOSPHERE

SEPTEMBER

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1011.6000	1168.0000	301.98
1.000	.999	902.5300	1061.0000	296.28
1.246	1.244	877.2700	1036.0000	294.94
2.000	1.997	803.7300	957.2000	292.52
3.000	2.995	714.2200	872.8000	285.08
4.000	3.993	632.7200	794.0000	277.59
5.000	4.990	558.8000	718.4000	270.87
6.000	5.988	492.0700	647.4000	264.78
7.000	6.984	431.9800	582.9000	258.18
8.000	7.981	377.9100	524.6000	250.96
9.000	8.977	329.3100	471.1000	243.52
10.000	9.973	285.7600	421.6000	236.13
11.000	10.968	246.8700	375.8000	228.83
12.000	11.964	212.3100	333.0000	222.11
13.000	12.959	181.7800	293.5000	215.77
14.000	13.953	154.9800	256.8000	210.25
15.000	14.948	131.6400	222.7000	205.95
16.000	15.942	111.5400	190.3000	204.15
17.000	16.935	94.4700	160.9000	204.50
18.000	17.929	80.1110	134.7000	207.19
19.000	18.922	68.1030	112.6000	210.64
20.000	19.915	58.0310	94.8100	213.22
21.000	20.907	49.5380	80.1500	215.32
22.000	21.899	42.3530	67.9100	217.27
23.000	22.891	36.2600	57.6700	219.05
24.000	23.882	31.0840	49.0500	220.76
25.000	24.874	26.6790	41.7900	222.42
26.000	25.865	22.9250	35.6500	224.04
27.000	26.855	19.7210	30.4500	225.61
28.000	27.845	16.9820	26.0700	226.90
29.000	28.835	14.6365	22.3500	228.18
30.000	29.825	12.6299	18.9100	230.54
32.000	31.802	9.4391	13.9600	233.32
34.000	33.779	7.0821	10.3200	236.84
36.000	35.755	5.2383	7.6490	240.73
38.000	37.729	4.0452	5.6850	245.48
40.000	39.703	3.0833	4.2340	251.20
42.000	41.675	2.3651	3.1760	256.93
44.000	43.646	1.8247	2.4010	262.17
46.000	45.615	1.4140	1.8380	265.36
48.000	47.584	1.0981	1.4200	268.73
50.000	49.551	.8538	1.1020	267.39
52.000	51.517	.6637	.8612	265.84
54.000	53.482	.5151	.6736	263.79
56.000	55.445	.3989	.5270	261.15
58.000	57.407	.3082	.4114	258.42
60.000	59.368	.2374	.3216	254.61
62.000	61.328	.1821	.2511	250.12
64.000	63.287	.1389	.1960	244.48
66.000	65.244	.1055	.1505	241.85
68.000	67.200	.0798	.1165	236.23
70.000	69.155	.0598	.0904	228.45

TABLE IV-10. HYDROSTATIC MODEL ATMOSPHERE

OCTOBER

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1014.4000	1203.0000	294.15
1.000	.999	902.5000	1086.0000	289.50
1.246	1.244	876.6700	1059.0000	288.44
2.000	1.997	801.7400	972.3000	287.24
3.000	2.995	710.9700	883.6000	280.31
4.000	3.993	628.6600	799.9000	273.78
5.000	4.990	554.3000	721.7000	267.58
6.000	5.988	487.2600	650.5000	260.96
7.000	6.984	426.8700	585.9000	253.79
8.000	7.981	372.5400	526.8000	246.34
9.000	8.977	323.7700	472.4000	239.7[illegible]
10.000	9.973	280.1300	422.0000	231.28
11.000	10.968	241.2800	374.5000	224.43
12.000	11.96[illegible]	206.9600	329.7000	218.68
13.000	12.959	176.8700	287.9000	214.00
14.000	13.953	150.6900	249.7000	210.23
15.000	14.948	128.0600	215.1000	207.42
16.000	15.942	108.6700	183.7000	206.11
17.000	16.935	92.1650	155.8000	205.08
18.000	17.929	78.2150	131.3000	207.50
19.000	18.922	66.4890	110.2000	210.23
20.000	19.915	56.6330	92.8100	212.57
21.000	20.907	48.3160	78.5200	214.37
22.000	21.899	41.2730	66.6100	215.86
23.000	22.891	35.2990	56.5200	217.57
24.000	23.882	30.2280	48.0300	219.[illegible]
25.000	24.874	25.9160	40.8800	220.84
26.000	25.865	22.2440	34.8800	222.19
27.000	26.855	19.1090	29.8000	223.37
28.000	27.845	16.4300	25.4900	224.51
29.000	28.835	14.1385	21.8100	225.81
30.000	29.825	12.1825	18.6300	228.45
32.000	31.802	9.0802	13.7100	231.14
34.000	33.779	6.7962	10.0900	235.08
36.000	35.755	5.1112	7.4710	238.75
38.000	37.729	3.8647	5.5340	243.70
40.000	39.703	2.9399	4.1130	249.42
42.000	41.675	2.2517	3.0720	255.81
44.000	43.646	1.7359	2.3150	261.71
46.000	45.615	1.3448	1.7680	265.38
48.000	47.584	1.0445	1.3660	266.92
50.000	49.551	.8120	1.0620	266.93
52.000	51.517	.6310	.8285	265.78
54.000	53.482	.4896	.6493	263.13
56.000	55.445	.3789	.5084	260.03
58.000	57.407	.2924	.3964	257.37
60.000	59.368	.2250	.3090	254.05
62.000	61.328	.1726	.2403	250.59
64.000	63.287	.1318	.1866	246.54
66.000	65.244	.1003	.1439	243.30
68.000	67.200	.0760	.1117	237.38
70.000	69.155	.0571	.0865	230.48

TABLE IV-11. HYDROSTATIC MODEL ATMOSPHERE

NOVEMBER

STATION = 722696 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1020.1000	1248.0000	285.10
1.000	.999	904.4600	1117.0000	282.16
1.246	1.244	877.9200	1086.0000	281.54
2.000	1.997	801.3100	990.8000	281.76
3.000	2.995	709.1400	894.1000	276.31
4.000	3.993	626.0900	804.9000	270.98
5.000	4.990	551.3100	725.2000	264.84
6.000	5.988	483.9300	653.8000	257.85
7.000	6.984	423.2800	588.1000	250.74
8.000	7.981	368.8200	527.3000	243.66
9.000	8.977	320.0600	471.7000	236.37
10.000	9.973	276.5300	420.5000	229.08
11.000	10.968	237.8600	372.5000	222.47
12.000	11.964	203.7500	327.3000	216.85
13.000	12.959	173.9200	285.0000	212.62
14.000	13.953	148.0700	245.9000	209.78
15.000	14.948	125.8300	211.2000	207.51
16.000	15.942	106.7800	180.3000	206.30
17.000	16.935	90.5630	133.3000	205.85
18.000	17.929	76.8130	129.7000	206.32
19.000	18.922	65.2120	109.2000	208.11
20.000	19.915	55.4490	91.9300	210.12
21.000	20.907	47.2190	77.6200	211.92
22.000	21.899	40.2630	65.7100	213.47
23.000	22.891	34.3730	55.6900	215.03
24.000	23.882	29.3800	47.2600	216.58
25.000	24.874	25.1380	40.2200	217.74
26.000	25.865	21.5290	34.2400	219.07
27.000	26.855	18.4570	29.1400	220.64
28.000	27.845	15.8410	24.8500	222.05
29.000	28.835	13.6112	21.1900	223.82
30.000	29.825	11.7082	18.1800	225.31
32.000	31.802	8.6970	13.2800	229.01
34.000	33.779	6.4913	9.7520	232.76
36.000	35.755	[illegible]	[illegible]	[illegible]
38.000	37.729	3.6713	5.3200	241.29
40.000	39.703	2.7852	3.9440	246.94
42.000	41.675	2.1272	2.9400	252.99
44.000	43.646	1.6348	2.2110	258.50
46.000	45.615	1.2629	1.6800	262.77
48.000	47.584	.0789	1.2910	265.20
50.000	49.551	.7599	1.0010	265.45
52.000	51.517	.5895	.7819	263.59
54.000	53.482	.4568	.6096	261.90
56.000	55.445	.3529	.4764	259.04
58.000	57.407	.2721	.3711	256.32
60.000	59.368	.2091	.2899	252.14
62.000	61.328	.1600	.2250	248.64
64.000	63.287	.1220	.1741	245.01
66.000	65.244	.0925	.1356	238.54
68.000	67.200	.0696	.1056	230.32
70.000	69.155	.0518	.0812	223.25

TABLE IV-12. HYDROSTATIC MODEL ATMOSPHERE

DECEMBER

STATION = 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1021.7000	1275.0000	279.54
1.000	.999	903.8800	1135.0000	277.50
1.246	1.244	876.9400	1103.0000	277.05
2.000	1.997	799.3600	1001.0000	278.22
3.000	2.995	706.2000	990.2000	273.37
4.000	3.993	622.8300	809.1000	268.16
5.000	4.990	547.7100	728.1000	262.07
6.000	5.988	480.1200	655.3000	255.23
7.000	6.984	419.3500	589.0000	248.01
8.000	7.981	364.0300	527.7000	240.86
9.000	8.977	316.0700	471.3000	233.61
10.000	9.973	272.6500	418.8000	226.81
11.000	10.968	234.2100	369.5000	220.83
12.000	11.964	200.4500	323.6000	215.79
13.000	12.959	171.0500	279.6000	213.11
14.000	13.953	145.7600	239.9000	211.63
15.000	14.948	124.0500	206.2000	209.62
16.000	15.942	105.4300	176.5000	208.05
17.000	16.935	89.5340	150.4000	207.32
18.000	17.929	76.0150	127.7000	207.35
19.000	18.922	64.5620	108.1000	208.15
20.000	19.915	54.8870	91.1900	209.68
21.000	20.9[illegible]	46.7220	77.0200	211.31
22.000	21.895	39.8180	65.2300	212.65
23.000	22.891	33.9730	55.2500	214.22
24.000	23.382	29.0210	46.8600	215.75
25.000	24.874	24.8180	39.8000	217.21
26.000	25.865	21.2470	33.8700	218.51
27.000	26.855	18.2070	28.8400	219.93
28.000	27.845	15.6190	24.5800	221.35
29.000	28.835	13.4099	21.0200	222.22
30.000	29.825	11.5254	18.0300	224.43
32.000	31.802	8.5537	13.1300	226.55
34.000	33.779	6.3860	9.5910	233.65
36.000	35.755	4.7972	7.0650	238.27
38.000	37.729	3.6259	5.2240	243.52
40.000	39.703	2.7593	3.8680	250.33
42.000	41.675	2.1160	2.8860	257.24
44.000	43.646	1.6337	2.1770	263.32
46.000	45.615	1.2681	1.6620	267.73
48.000	47.584	.9871	1.2860	269.23
50.000	49.551	.7689	1.0040	268.85
52.000	51.517	.5984	.7863	267.06
54.000	53.482	.4647	.6180	263.88
56.000	55.445	.3597	.4859	259.75
58.000	57.407	.2773	.3806	255.66
60.000	59.368	.2130	.2966	251.94
62.000	61.328	.1630	.2300	248.65
64.000	63.287	.1243	.1782	244.71
66.000	65.244	.0943	.1383	239.07
68.000	67.200	.0710	.1073	232.01
70.000	69.155	.0528	.0841	220.29

TABLE IV-13 HYDROSTATIC MODEL ATMOSPHERE

ANNUAL

STATION • 722698 WHITE SAND MISSILE RANGE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1013.7000	1199.0000	295.30
1.000	.999	902.1200	1004.0000	[illegible]
1.246	1.244	[illegible]	1057.0000	298.74
2.000	1.997	801.4100	973.7000	[illegible]
3.000	2.995	710.5100	884.9000	[illegible]
4.000	3.993	628.0400	812.0000	272.62
5.000	4.990	553.4200	724.8000	265.99
6.000	5.988	486.0900	653.5000	259.12
7.000	6.984	425.4500	587.8000	252.15
8.000	7.981	370.9900	527.6000	244.97
9.000	[illegible]	[illegible]	[illegible]	[illegible]
10.000	9.973	278.6100	421.1000	230.49
11.000	10.968	239.8000	373.0000	224.01
12.000	11.964	205.7000	328.1000	218.44
13.000	12.959	175.8100	285.5000	214.54
14.000	13.953	149.8300	246.9000	211.52
15.000	14.949	127.5200	212.8000	209.75
16.000	15.942	108.3100	182.1000	207.16
17.000	16.935	91.9740	154.8000	206.82
18.000	17.929	78.0460	130.8000	207.91
19.000	18.922	66.3490	110.1000	209.98
20.000	19.915	56.5000	92.7800	212.14
21.000	20.907	48.1910	78.3900	214.16
22.000	21.899	41.1630	66.4100	215.93
23.000	22.891	35.2070	56.3500	217.61
24.000	23.882	30.1500	47.8900	219.34
25.000	24.874	25.8520	40.7600	220.96
26.000	25.865	22.1910	34.7500	222.46
27.000	26.855	19.0700	29.6400	224.11
28.000	27.845	16.4070	25.3000	225.64
29.000	28.835	14.1312	21.6500	227.35
30.000	[illegible]	[illegible]	[illegible]	[illegible]
32.000	31.802	9.0945	13.5000	233.03
34.000	33.779	6.8254	9.9370	237.98
36.000	35.755	5.1517	7.3540	242.32
38.000	37.729	3.9120	5.4640	247.64
40.000	39.703	2.9689	4.0730	253.46
42.000	41.675	2.2980	3.0680	259.10
44.000	43.646	1.7763	2.3290	263.65
46.000	45.615	1.3784	1.7880	266.70
48.000	47.584	1.0717	1.3640	267.85
50.000	49.551	.8337	1.0790	267.34
52.000	51.517	.6480	.8441	265.50
54.000	53.402	.5026	.6611	262.94
56.000	55.445	.3889	.5175	259.87
58.000	57.407	.3000	.4039	256.95
60.000	59.368	.2307	.3150	253.30
62.000	61.328	.1769	.2452	249.36
64.000	63.287	.1348	.1903	245.07
66.000	65.244	.1024	.1470	240.89
68.000	67.200	.0774	.1134	235.89
70.000	69.155	.0580	.0877	228.88

APPENDIX A

EXAMPLES OF WIND STATISTICS FOR WHITE SANDS MISSILE RANGE, NEW MEXICO

Appendix A gives some examples of graphical displays of wind statistics that can be derived from the statistical parameters presented in table I. These illustrations should aid the user of the RRA to understand the functional relationships of the probability wind models and, thus, to develop an appreciation of the powerful properties of the bivariate normal probability distribution function.

All illustrations for this appendix are derived from the five wind component statistical parameters from table I.1 for January and table I.7 for July for eight selected altitudes. These selected altitudes are 4, 12, 20, 30, 40, 50, 60, and 70 km.

1. Windspeed (Tables A-1 and A-2)

The five wind component parameters from table I are used in equation (29) to calculate the generalized Rayleigh probability density function (pdf) and then numerically integrated as indicated by equation (30) to obtain the probability distribution function (PDF) for windspeed. From the PDF interpolations are made to obtain the percentile values for windspeed as shown in tables A-1 and A-2.

2. Frequency of Wind Direction (Figures A-1 through A-16)

The derived frequencies for wind direction shown in figures A-1 through A-16 were obtained using the five wind component parameters from tables I.1 and I.7 as input values in equation (35). The limits of integration (performed numerically) are over the 22.5-degree interval for each of the 16 compass points. These graphs give the percentage frequency that the wind will blow from the direction intervals.

3. Mean Wind Components and 80th Interpercentile Range of Wind Components (Figures A-17 through A-32)

The wind component means with respect to any orthogonal axes are obtained by using the zonal and meridional mean wind components in equations (44) and (45). These component means form the circles shown in figures A-17 through A-32. Further, the zonal and meridonal wind component variances and correlation coefficients are used in equations (46) and (47) to obtain the variances with respect to any orthogonal axes. These rotated component variances and the rotated component means are used in equation (8) to obtain the 80th interpercentile range of wind components and are then illustrated in figures A-17 through A-32.

4. Probability Ellipses (Figures A-33 through A-48)

Using the five wind component parameters from tables I.1 and I.7 and $p = 0.50$, $p = 0.95$, and $p = 0.99$ as input values to equation (13), the wind probability ellipses shown in figures A-33 through A-48 were obtained by computer graphics. The statistical inferences are, for example, that

50 percent of the wind vectors lie within the smaller ellipse and 99 percent of the wind vectors lie within the outer ellipse. These probability ellipses are illustrated using the standard meteorological coordinate system explained in section I.B.1.

5. Conditional Windspeed Given the Wind Direction (Figures A-49 through A-64)

The five wind component parameters from table I.1 and table I.7 are used to evaluate the conditional probability distribution function, equation (41). Figures A-49 through A-64 show interpolations of the conditional function made to obtain the 5th, 15th, 50th (median), 85th, 95th, and 99th conditional percentile values of windspeed, given the wind directions. The conditional mean windspeed, given the wind direction, is obtained from equation (40). The conditional mode (most probable) windspeed, given the wind direction, is obtained from equation (38). The conditional mean windspeed and the conditional windspeed modal value, given the wind direction, are also shown in these figures. For some figures, the conditional windspeed values are invalid for the given wind direction near 270° (from the west). This is caused by the lack of computational precision in evaluating equations (40) and (41) when the arguments for the Gaussian probability distribution have large negative values, i.e., when the coefficients (b/a) become less than -4 in these equations.

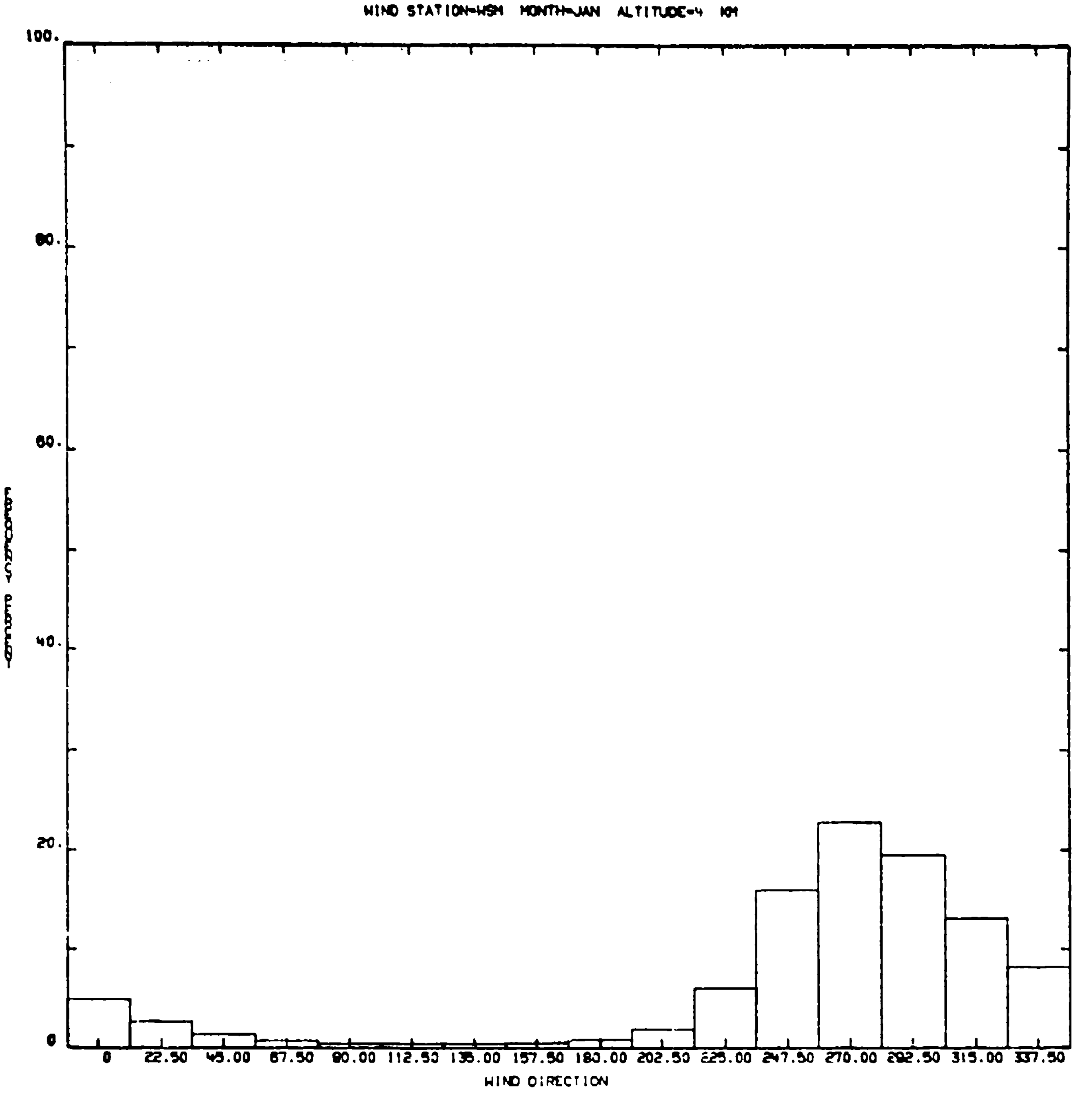
This appendix contains only a few of the many options in presenting wind statistics illustrations.

TABLE A-1. DERIVED (RAYLEIGH) PERCENTILE VALUE OF WINDSPEED, WHITE SANDS MISSILE RANGE, NEW MEXICO, JANUARY

Altitude (km)	4	12	20	30	40	50	60	70
P %	W M/S	W M/S	W M/S	W M/S	W M/S	W M/S	W M/S	W M/S
1.0	1.44	3.38	1.14	1.42	2.41	5.41	8.17	14.29
2.5	2.37	5.40	1.85	2.35	3.90	8.61	12.90	22.27
5.0	3.40	7.71	2.65	3.39	5.57	12.26	18.19	30.88
10.0	4.90	11.07	3.87	4.93	8.07	17.57	25.63	42.41
15.0	6.09	13.75	4.84	6.17	10.11	21.82	31.39	50.89
20.0	7.12	16.11	5.71	7.30	11.95	25.57	36.32	57.92
30.0	8.98	20.35	7.33	9.41	15.39	32.36	44.90	69.74
40.0	10.71	24.29	8.90	11.52	18.61	38.79	52.64	80.12
50.0	12.43	28.17	10.50	13.77	22.44	45.27	60.10	89.97
60.0	14.22	32.21	12.22	16.32	26.47	52.12	67.72	99.93
70.0	16.21	36.63	14.16	19.37	31.21	59.75	75.98	110.68
80.0	18.60	41.90	16.52	23.31	37.18	68.95	85.75	123.35
85.0	20.09	45.16	17.97	25.89	40.82	74.70	91.76	131.18
90.0	21.99	49.33	19.85	29.27	45.91	81.99	99.41	141.05
95.0	24.86	55.52	22.66	34.46	53.35	92.90	110.77	155.75
97.5	27.38	60.90	25.09	39.07	59.88	102.42	120.65	168.55
99.0	30.31	67.20	27.94	44.56	67.54	113.55	132.18	183.47

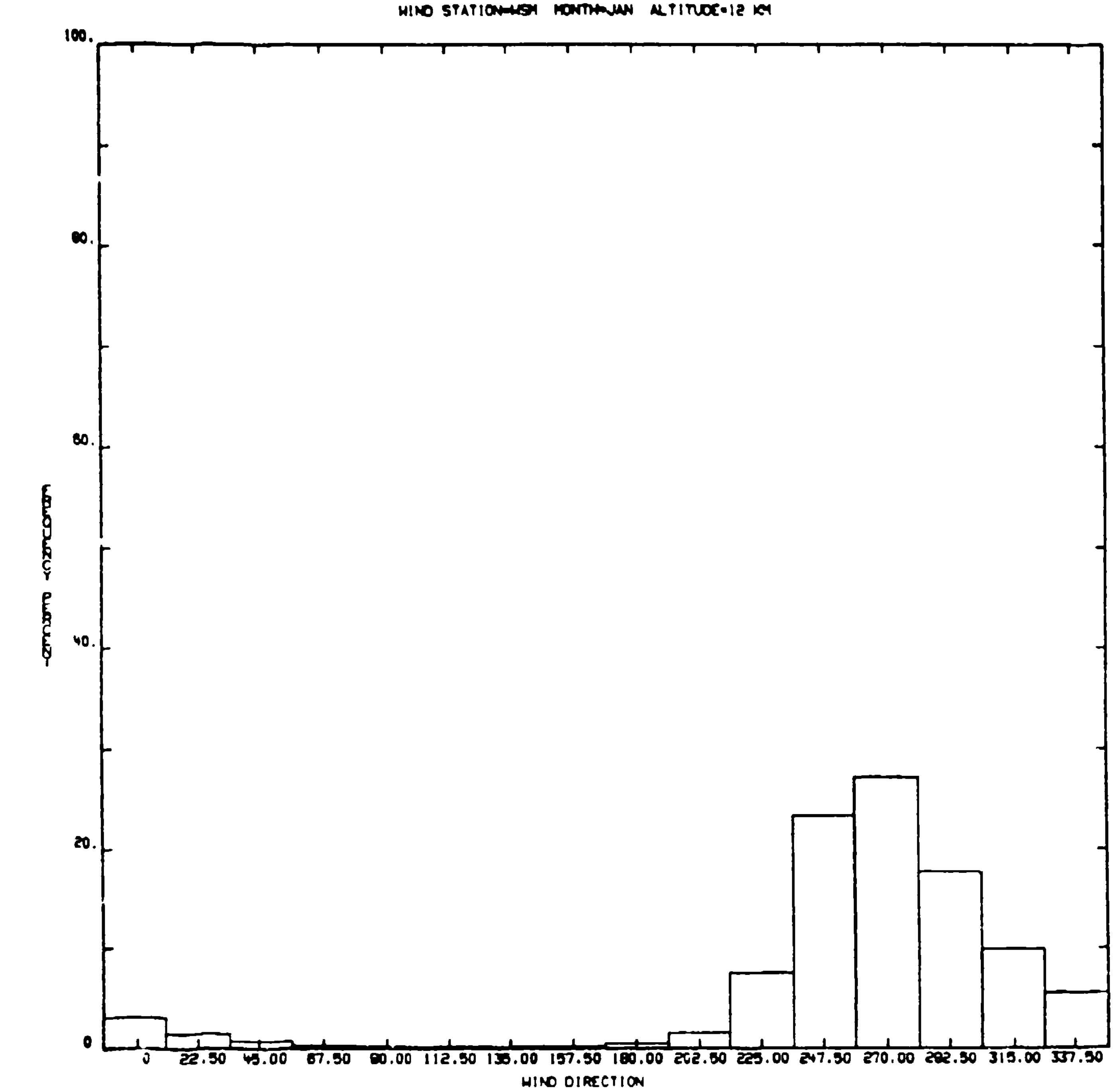
TABLE A-2. DERIVED (RAYLEIGH) PERCENTILE VALUE OF WINDSPEED, WHITE SANDS MISSILE RANGE, NEW MEXICO, JULY

		12	20	30	40	50	60	70
P %	R M/S	R M/S	R M/S	R M/S	R M/S	R M/S	R M/S	R M/S
1.0	.35	1.09	3.05	13.11	20.06	29.16	16.92	4.62
2.5	.89	1.74	4.09	14.47	22.23	32.56	23.66	7.36
5.0	1.27	2.51	5.05	15.69	24.12	35.49	29.65	10.49
10.0	1.90	3.63	6.14	17.10	26.29	38.89	37.21	15.07
15.0	2.36	4.53	6.90	18.05	27.76	41.17	42.27	18.73
20.0	2.75	5.32	7.49	18.76	28.94	42.99	46.33	21.97
30.0	3.53	6.75	8.49	20.01	30.83	45.95	52.99	27.85
40.0	4.24	8.11	9.35	21.05	32.46	48.48	58.72	33.42
50.0	4.95	9.48	10.15	22.02	33.96	50.85	64.09	39.05
60.0	5.71	10.93	10.95	22.99	35.51	53.23	69.49	45.06
70.0	6.56	12.60	11.81	24.03	37.14	55.76	75.28	51.90
80.0	7.61	14.66	12.82	25.26	39.04	58.74	82.08	60.37
85.0	8.27	15.97	13.46	25.99	40.22	60.57	86.26	65.81
90.0	9.12	17.72	14.23	26.94	41.70	62.96	91.53	72.97
95.0	10.48	20.41	15.40	28.37	43.86	66.27	99.36	83.77
97.5	11.67	22.85	16.41	29.59	45.79	69.23	106.15	93.55
99.0	13.04	25.81	17.60	30.95	47.97	72.66	114.05	105.22



WIND STATION=WSM MONTH=JAN ALTITUDE=4 KM
100.
80.
60.
40.
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-1.



WIND STATION=WSM MONTH=JAN ALTITUDE=12 KM
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60.
40.
20.
0
0
22.50
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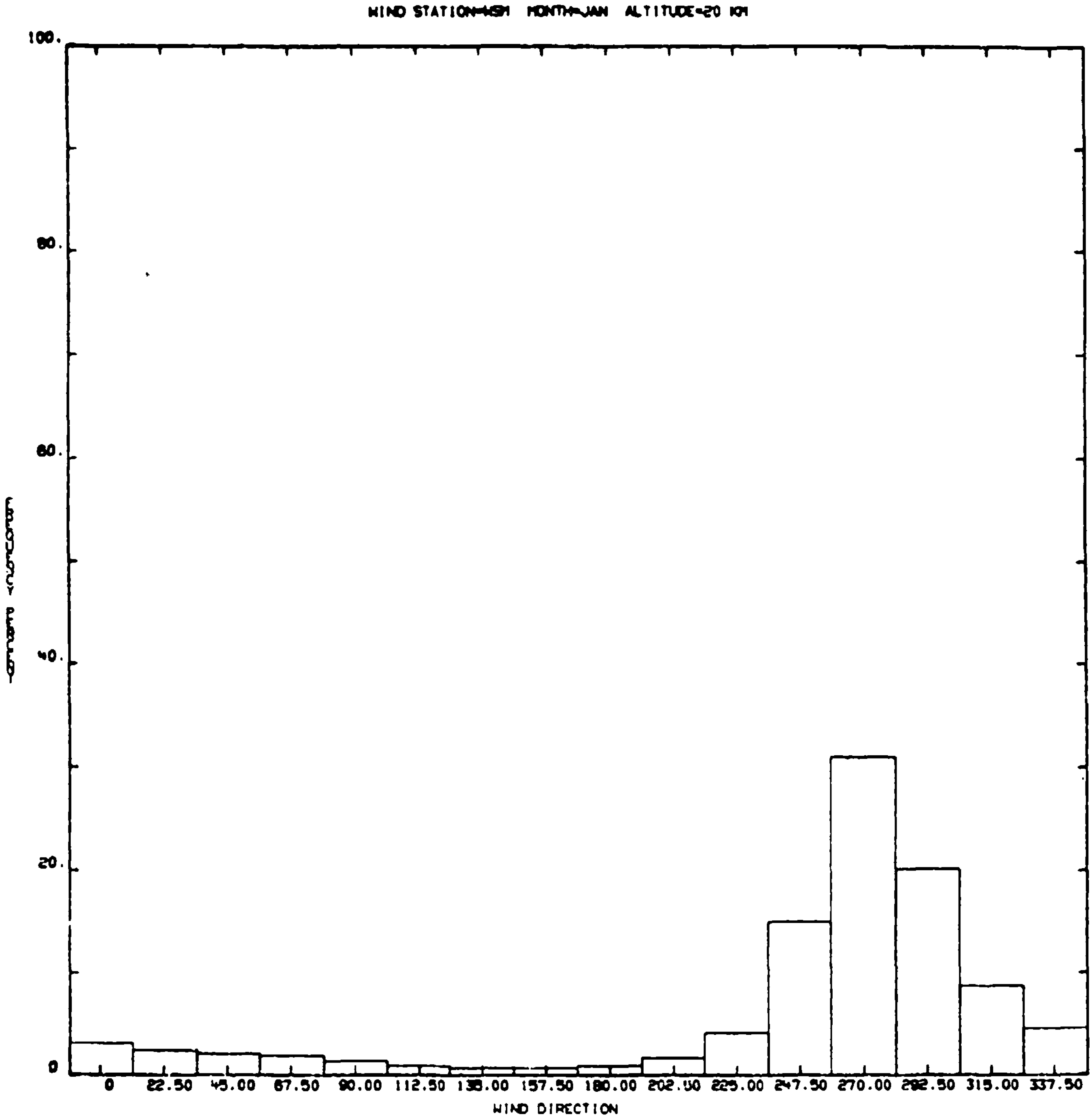
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-2.



WIND STATION=WSM MONTH=JAN ALTITUDE=20 KM
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80.
60.
40.
20.
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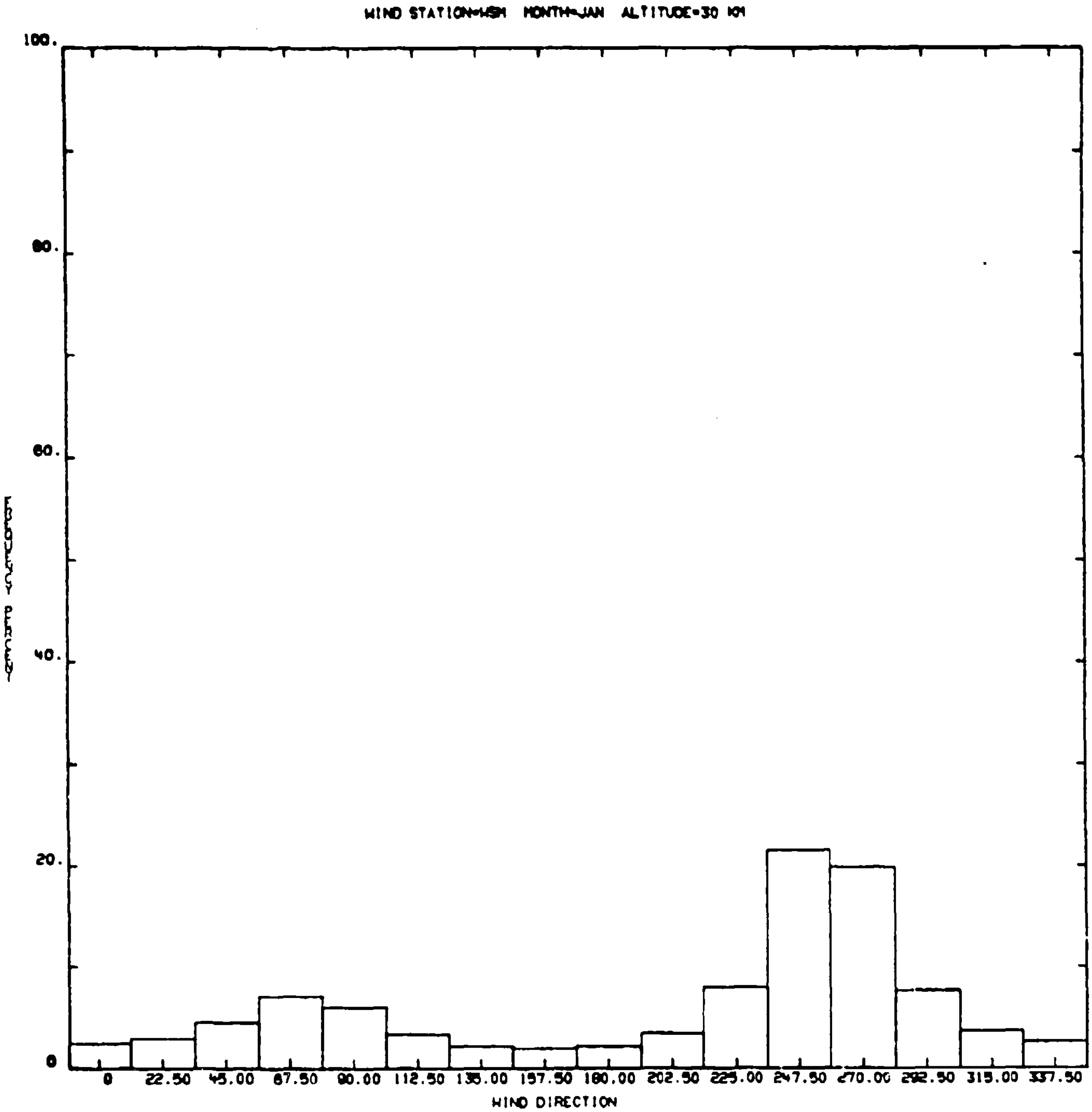
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-3.



WIND STATION=WSM MONTH=JAN ALTITUDE=30 KM
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80.
60.
40.
20.
0
FREQUENCY PERCENT
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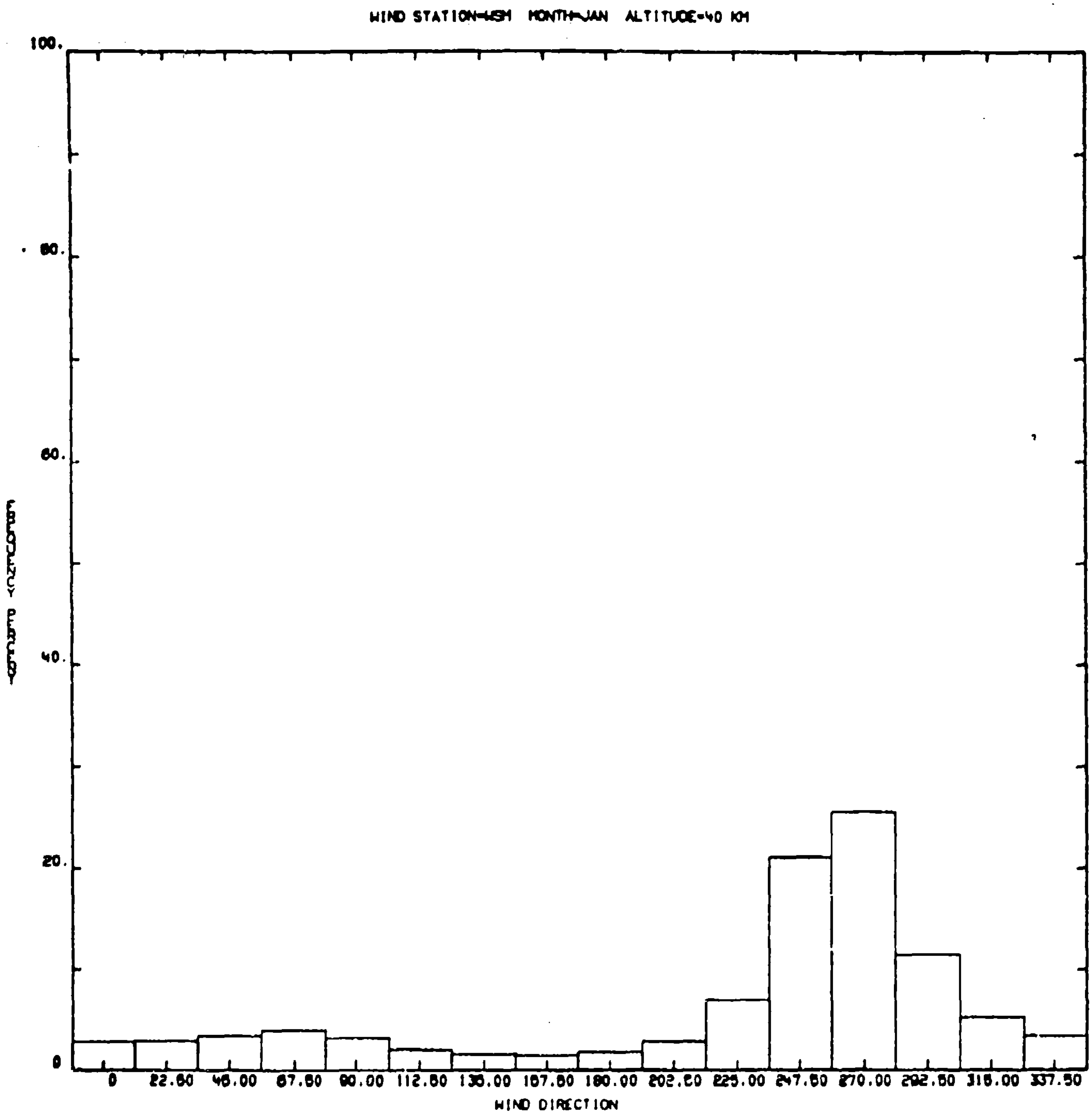
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-4.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60.
40.
20.
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FREQUENCY PERCENT
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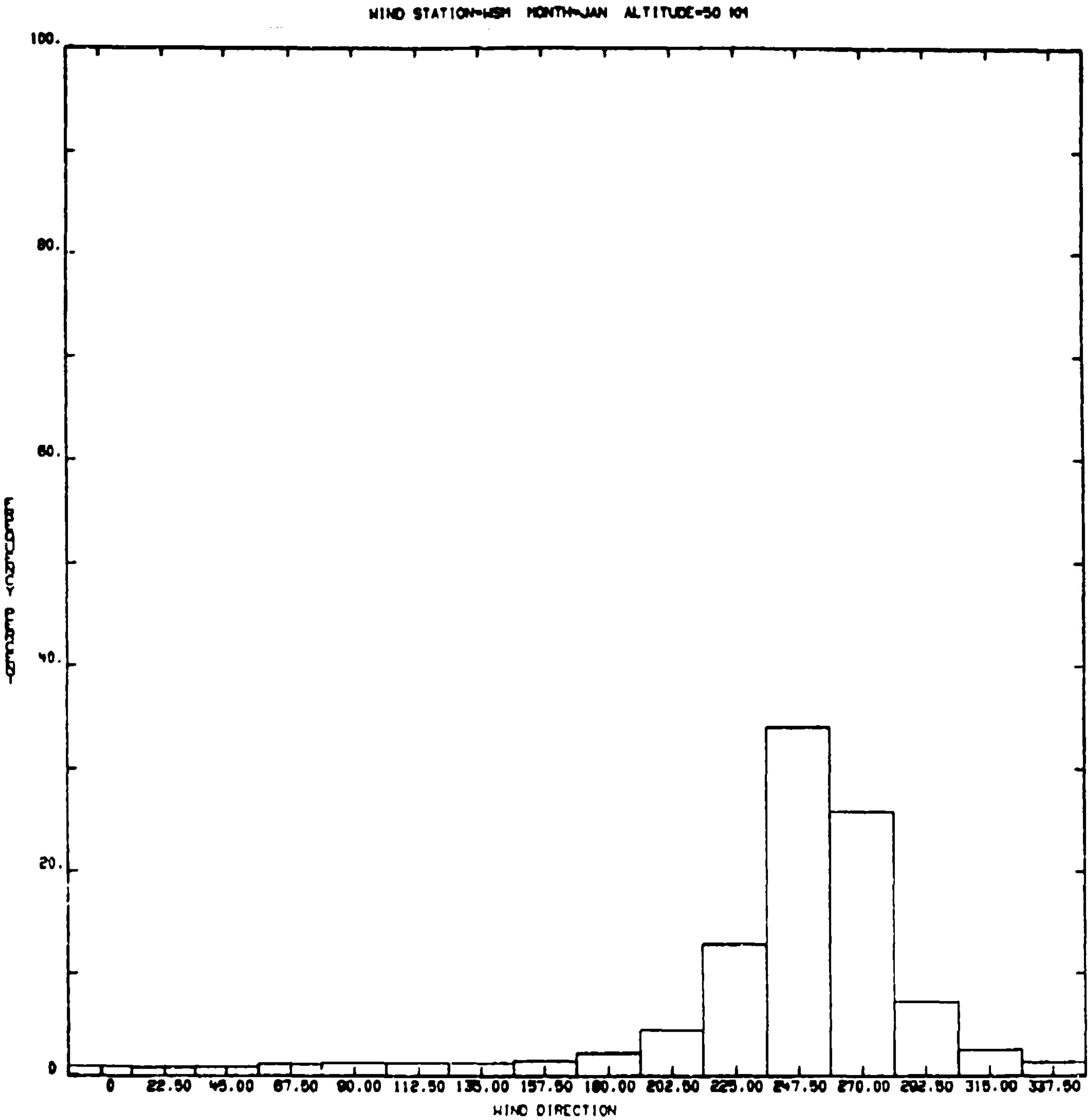
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-5.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0
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90.00
112.50
135.00
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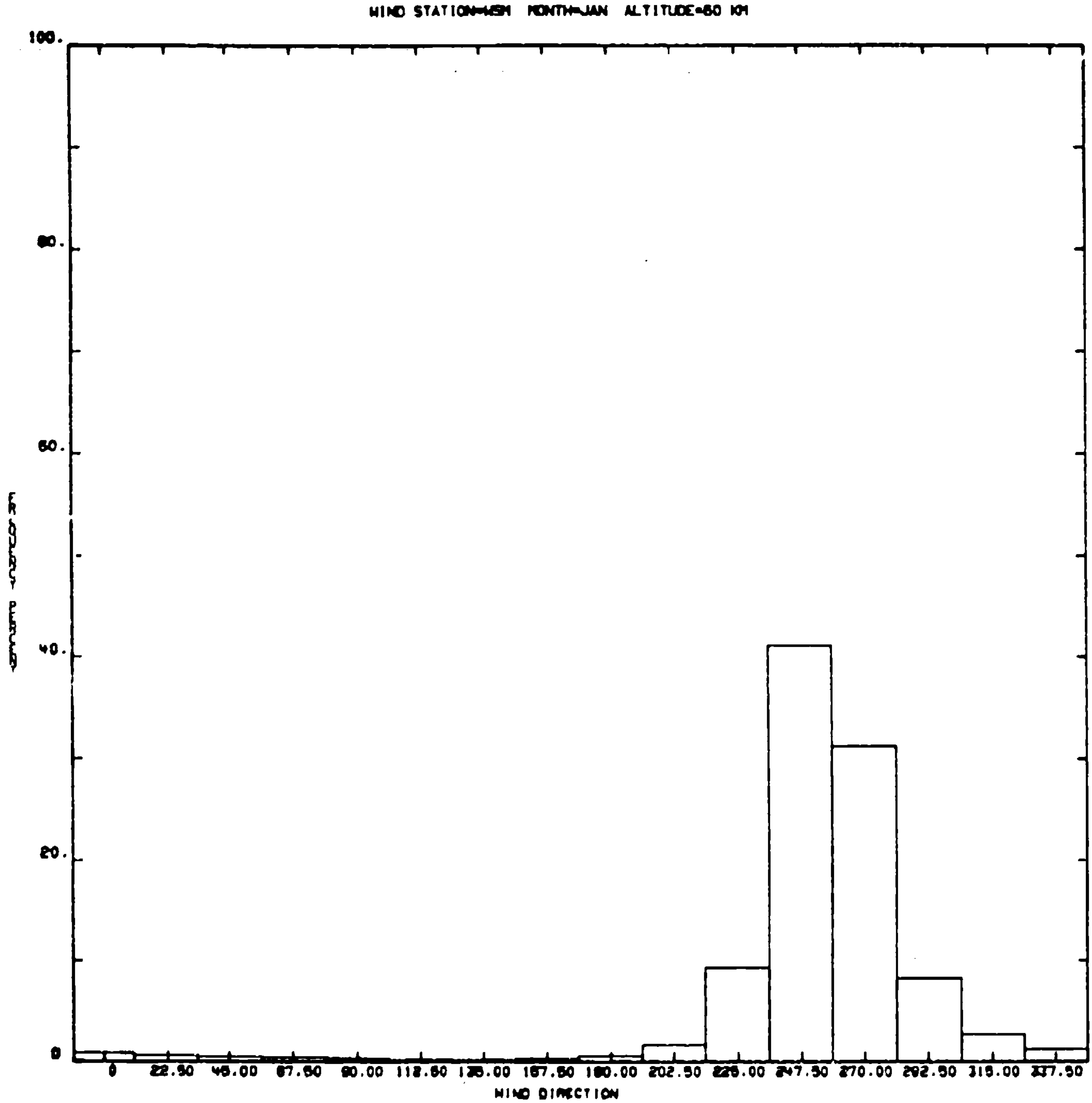
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-6.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60.
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20.
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0
22.50
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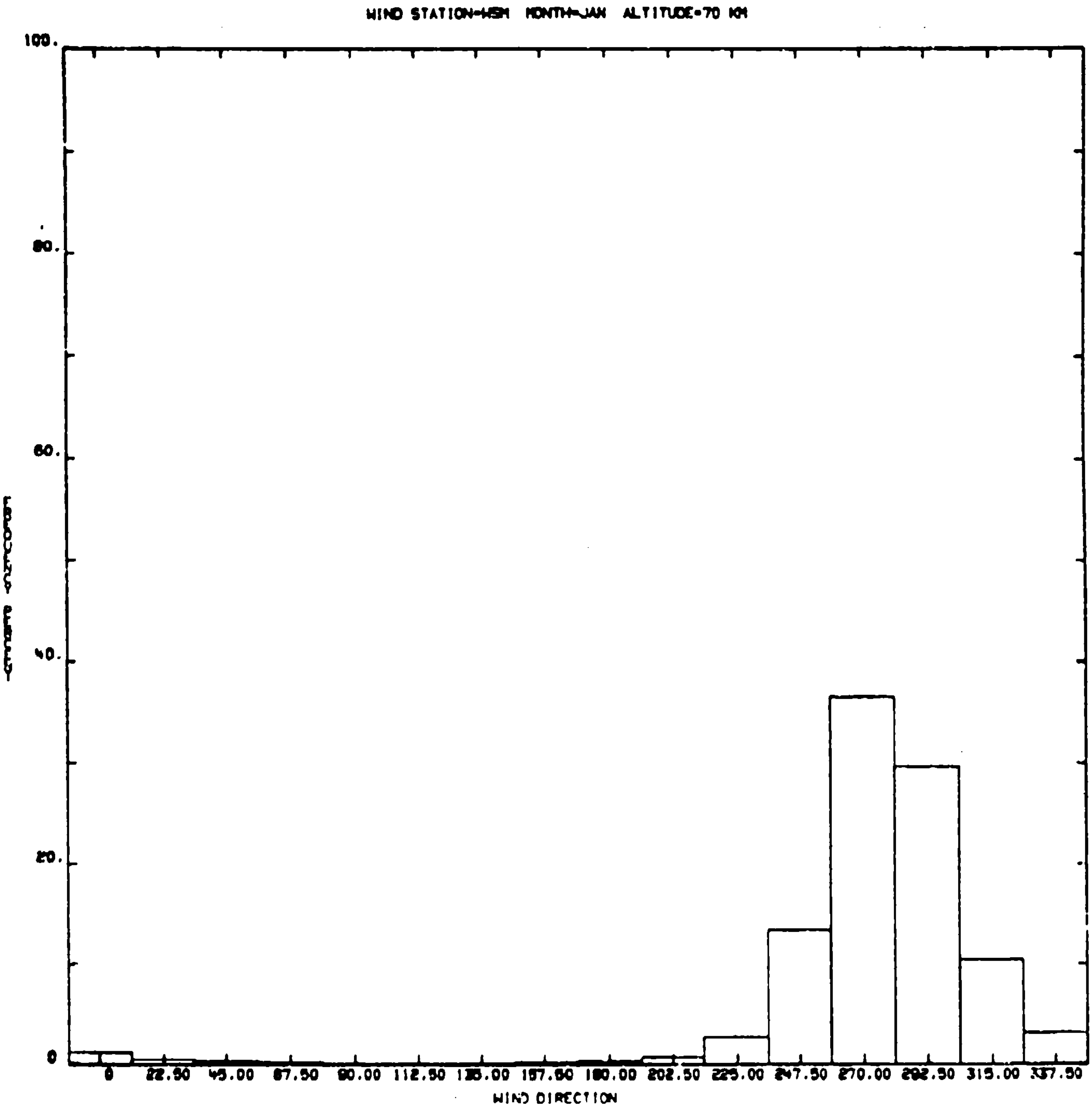
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-7.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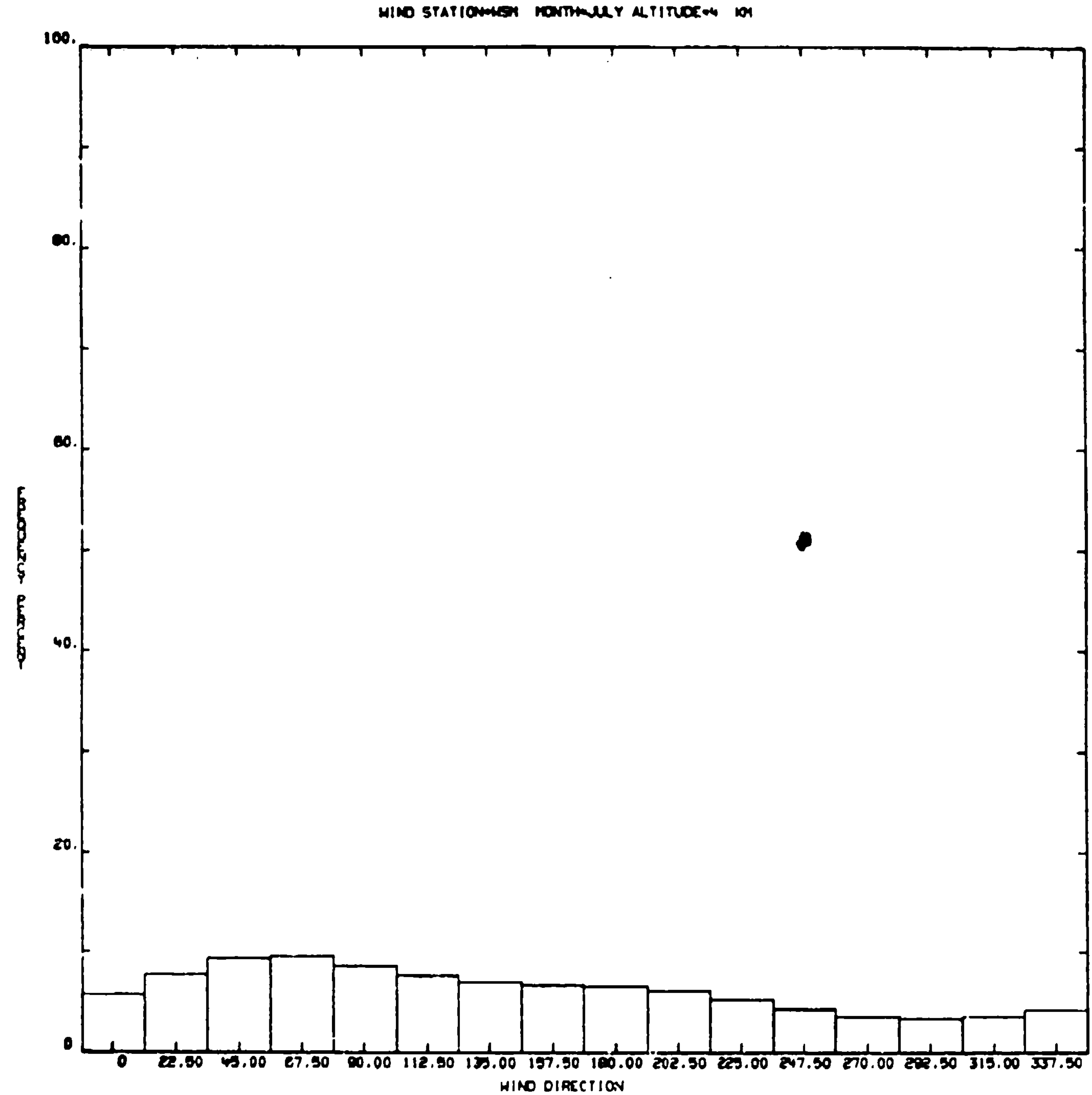
80.
60.
40.
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-8.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80.
60.
40.
20.
0
FREQUENCY PERCENT
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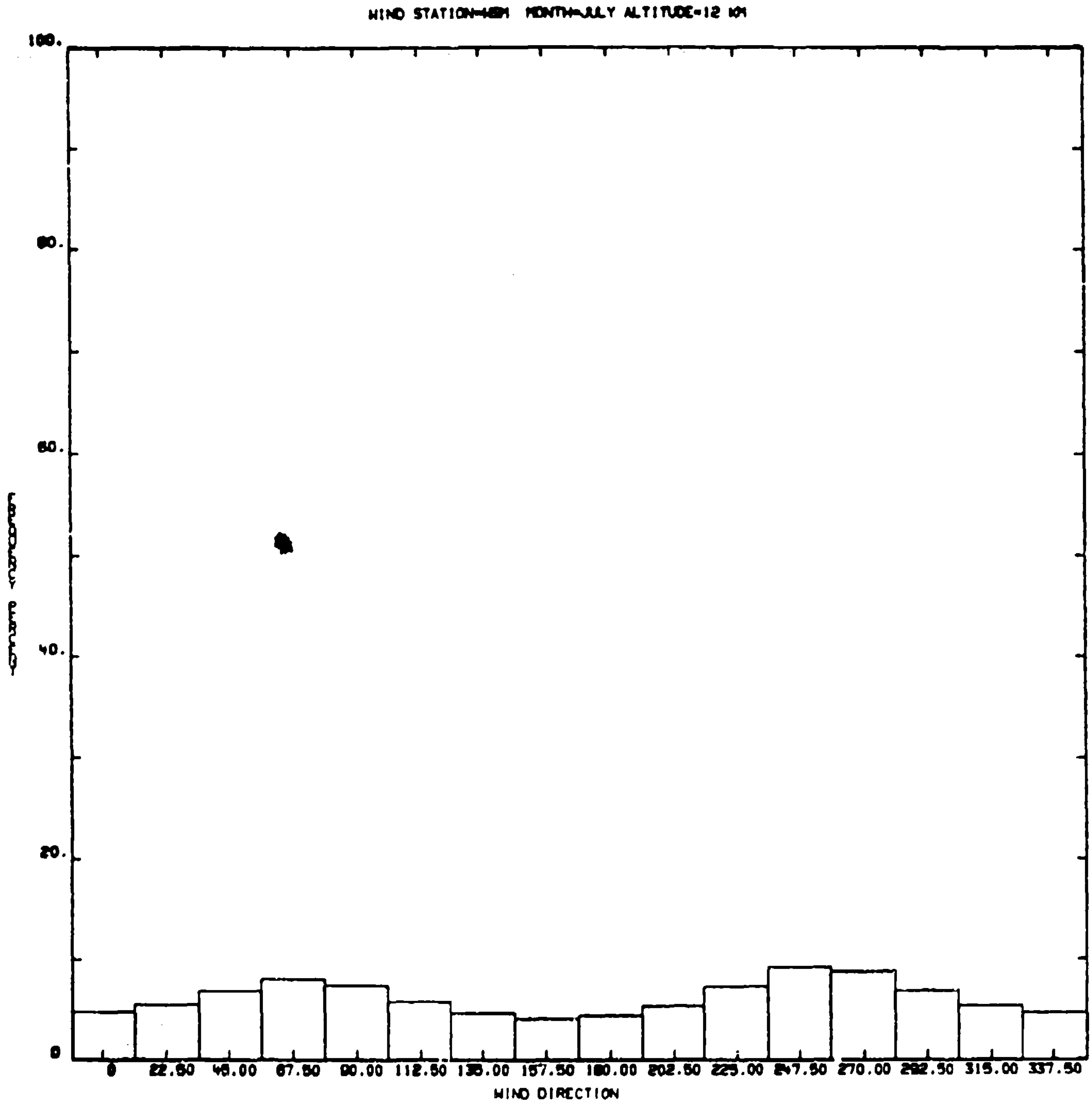
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-9.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60.
40.
20.
0
0
22.50
45.00
67.50
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112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-10.

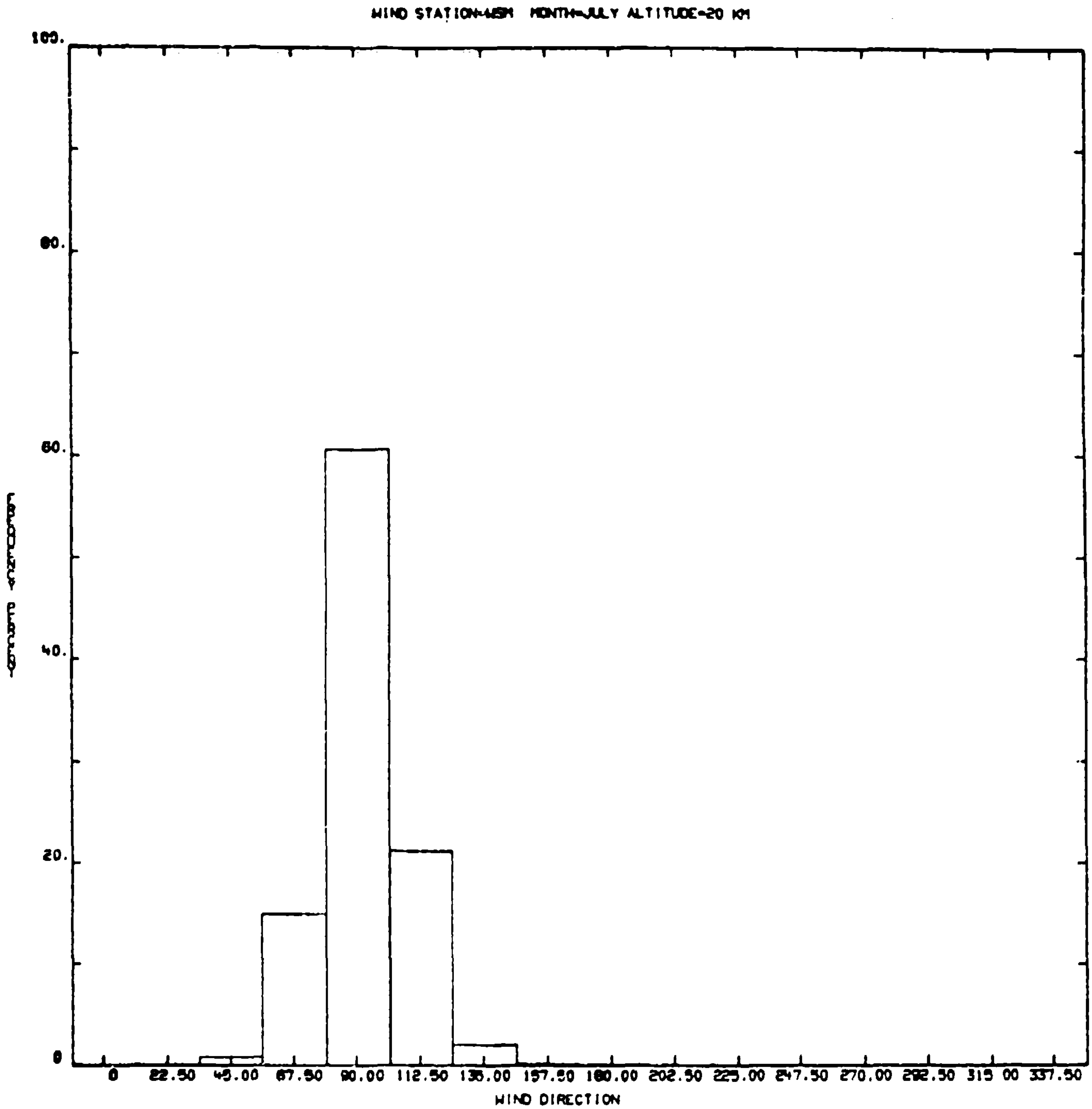

WIND STATION=WSM MONTH=JULY ALTITUDE=20 KM
100.
80.
60.
40.
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315 00
337.50
WIND DIRECTION

Figure A-11.

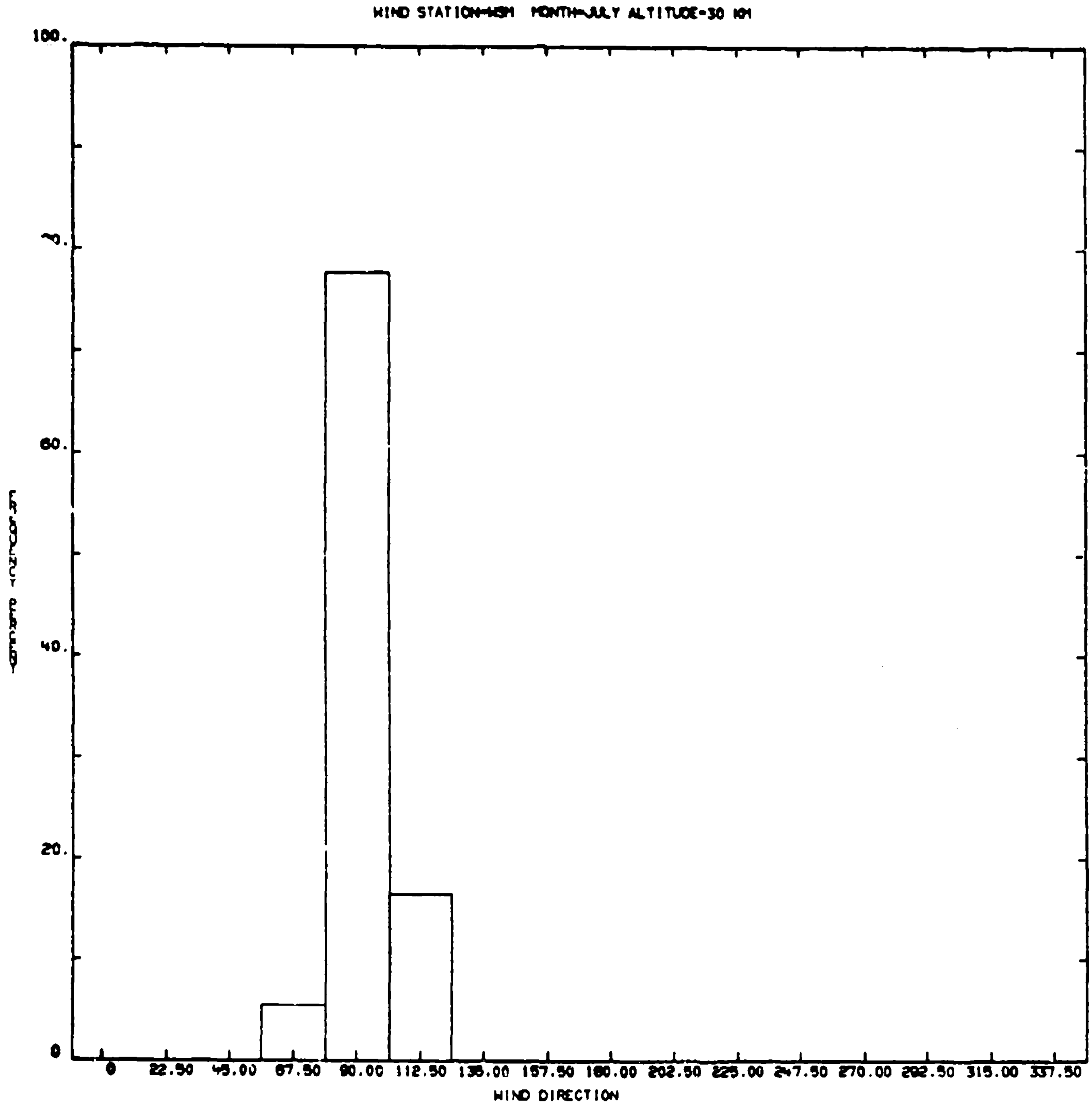
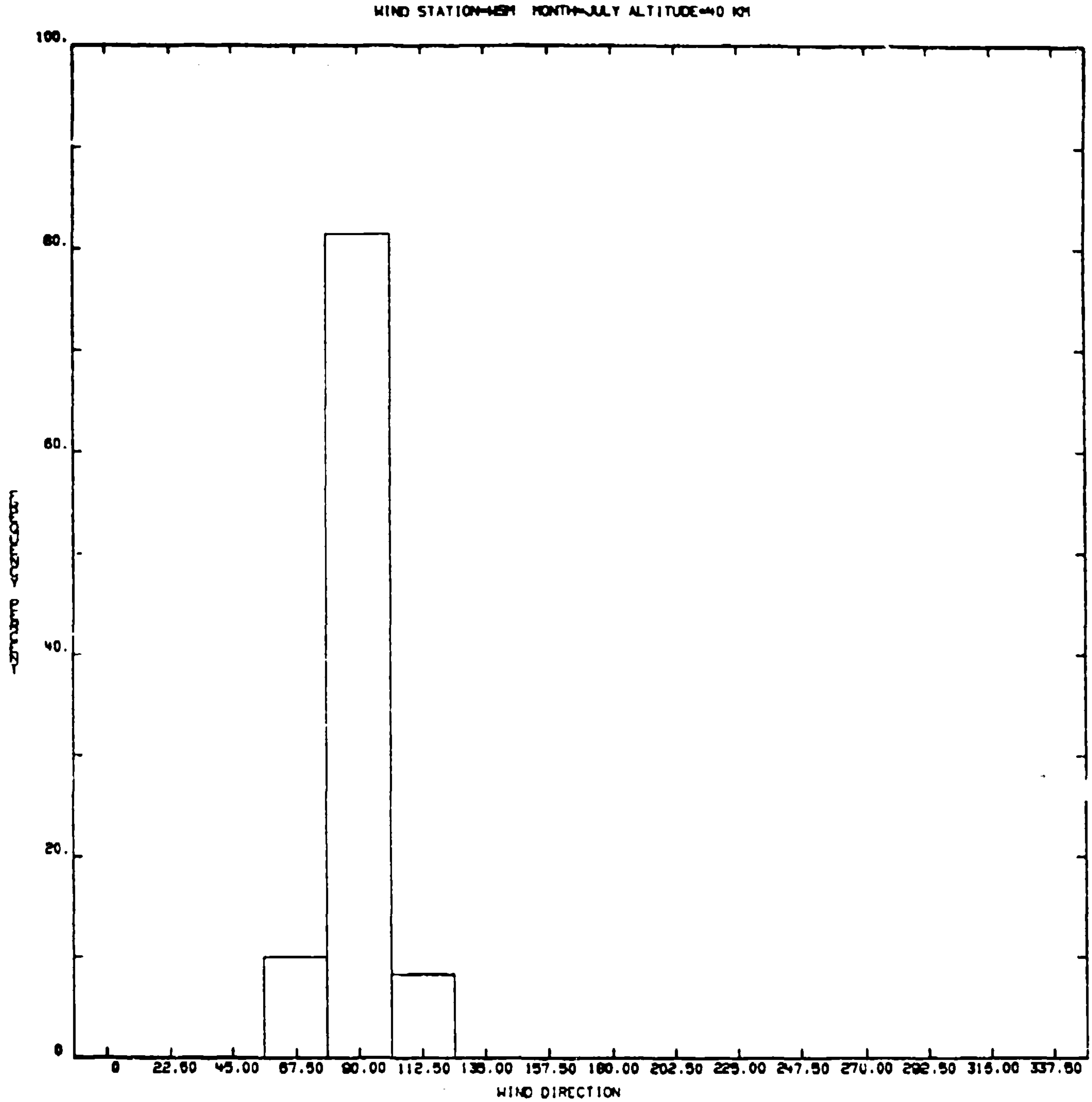

WIND STATION=WSM MONTH=JULY ALTITUDE=30 KM
100.
60.
40.
20.
0
FREQUENCY PERCENT
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 180.00 202.50 225.00 247.50 270.00 292.50 315.00 337.50
WIND DIRECTION

Figure A-12.



WIND STATION=WSM MONTH=JULY ALTITUDE=40 KM
100.
80.
60.
40.
20.
0
FREQUENCY PERCENT
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-13.

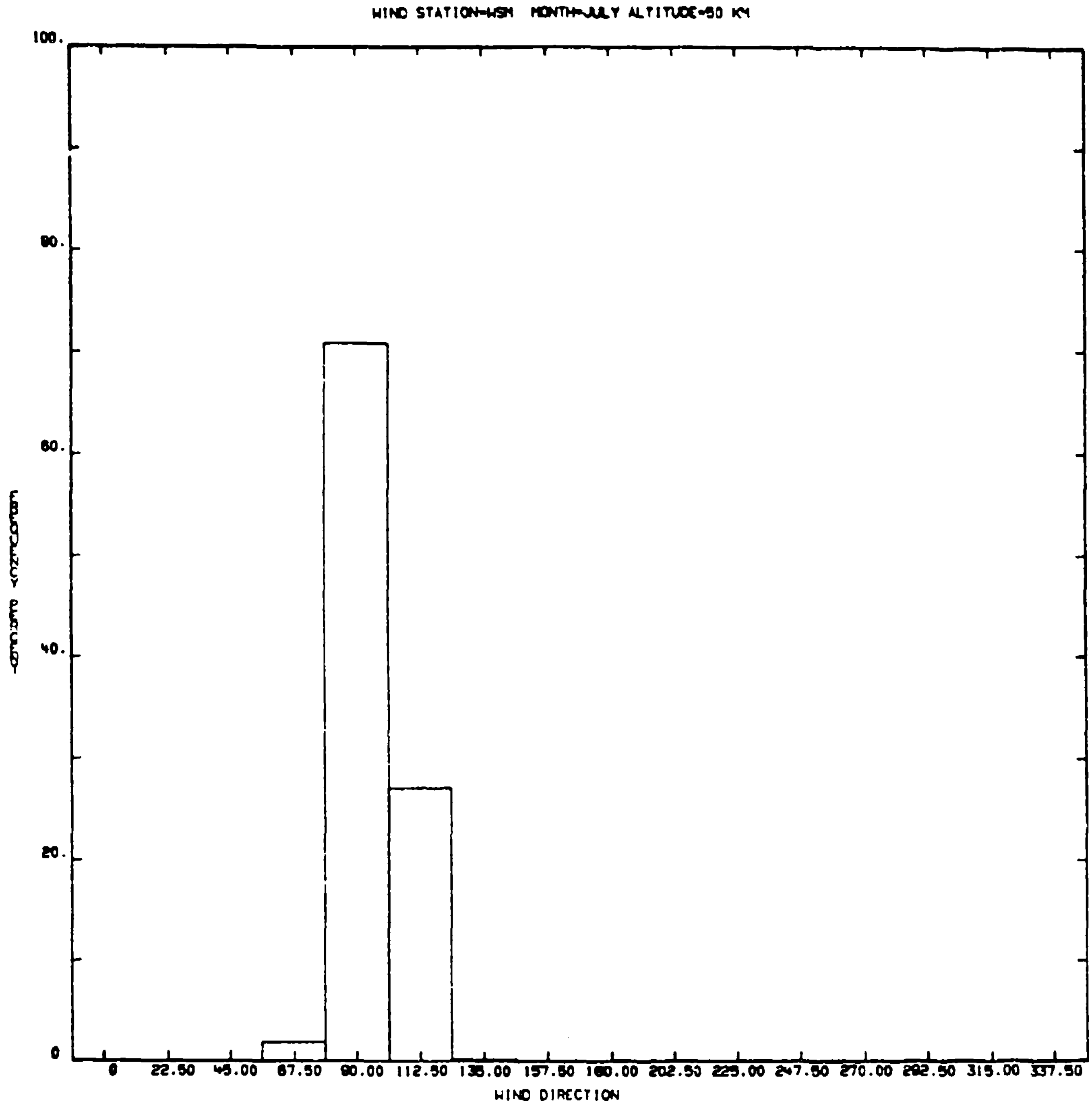

WIND STATION=WSM MONTH=JULY ALTITUDE=50 KM
100.
80.
60.
40.
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-14.

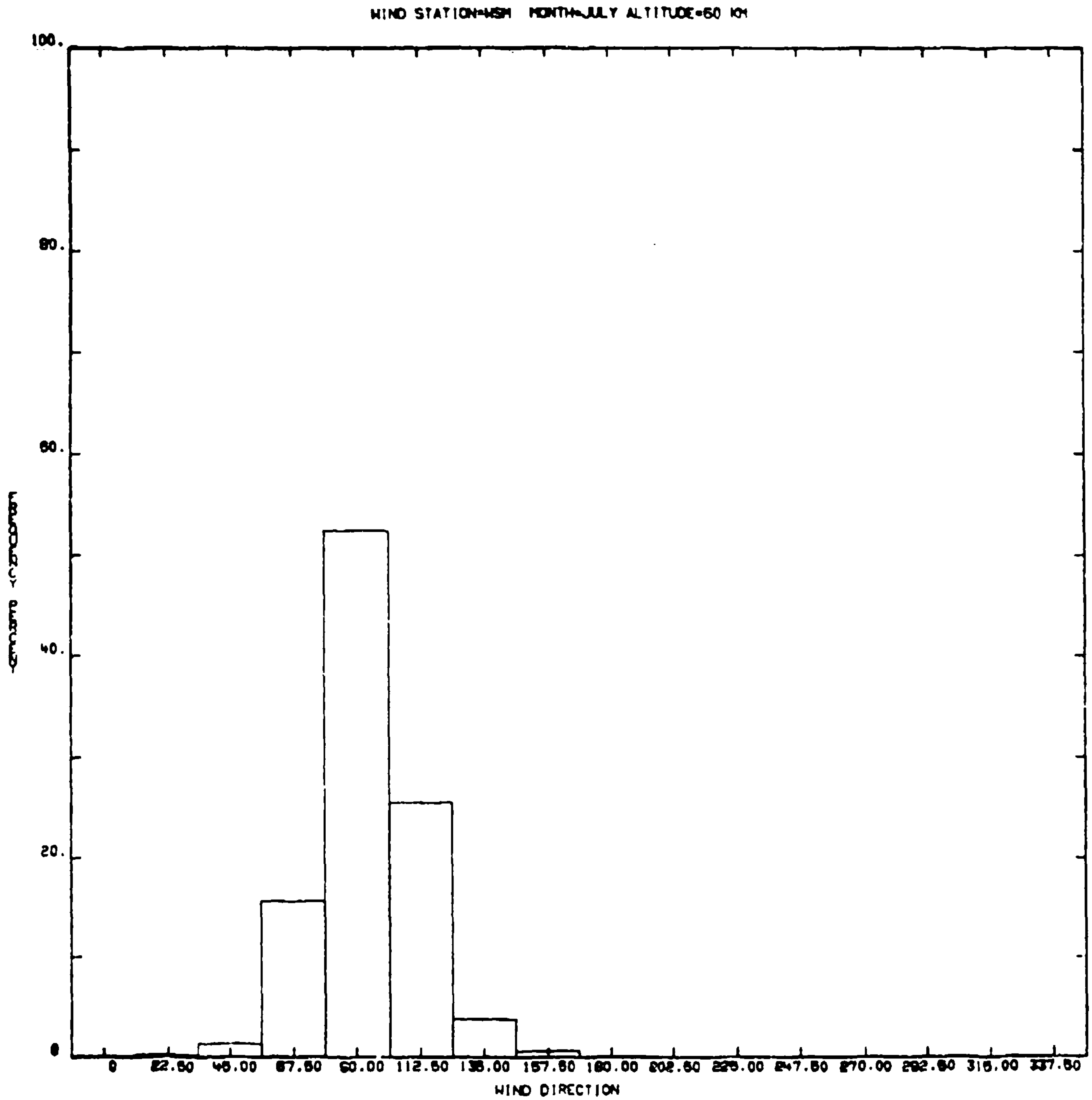

WIND STATION=WSM MONTH=JULY ALTITUDE=60 KM
100.
80.
60.
40.
20.
0
FREQUENCY PERCENT
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-15.

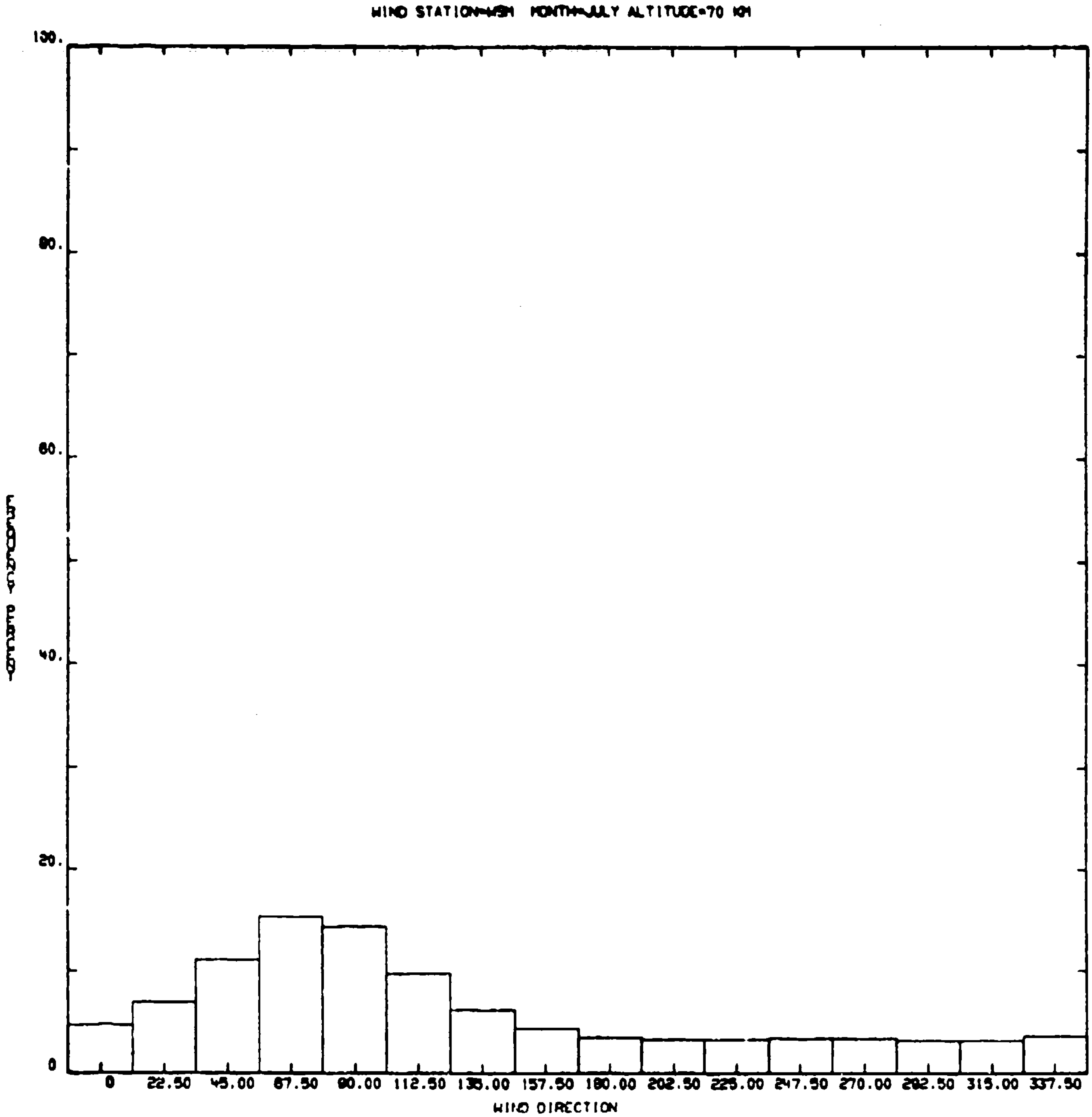

WIND STATION=WSM MONTH=JULY ALTITUDE=70 KM
100.
80.
60.
40.
20.
0
FREQUENCY PERCENT
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
WIND DIRECTION

Figure A-16.

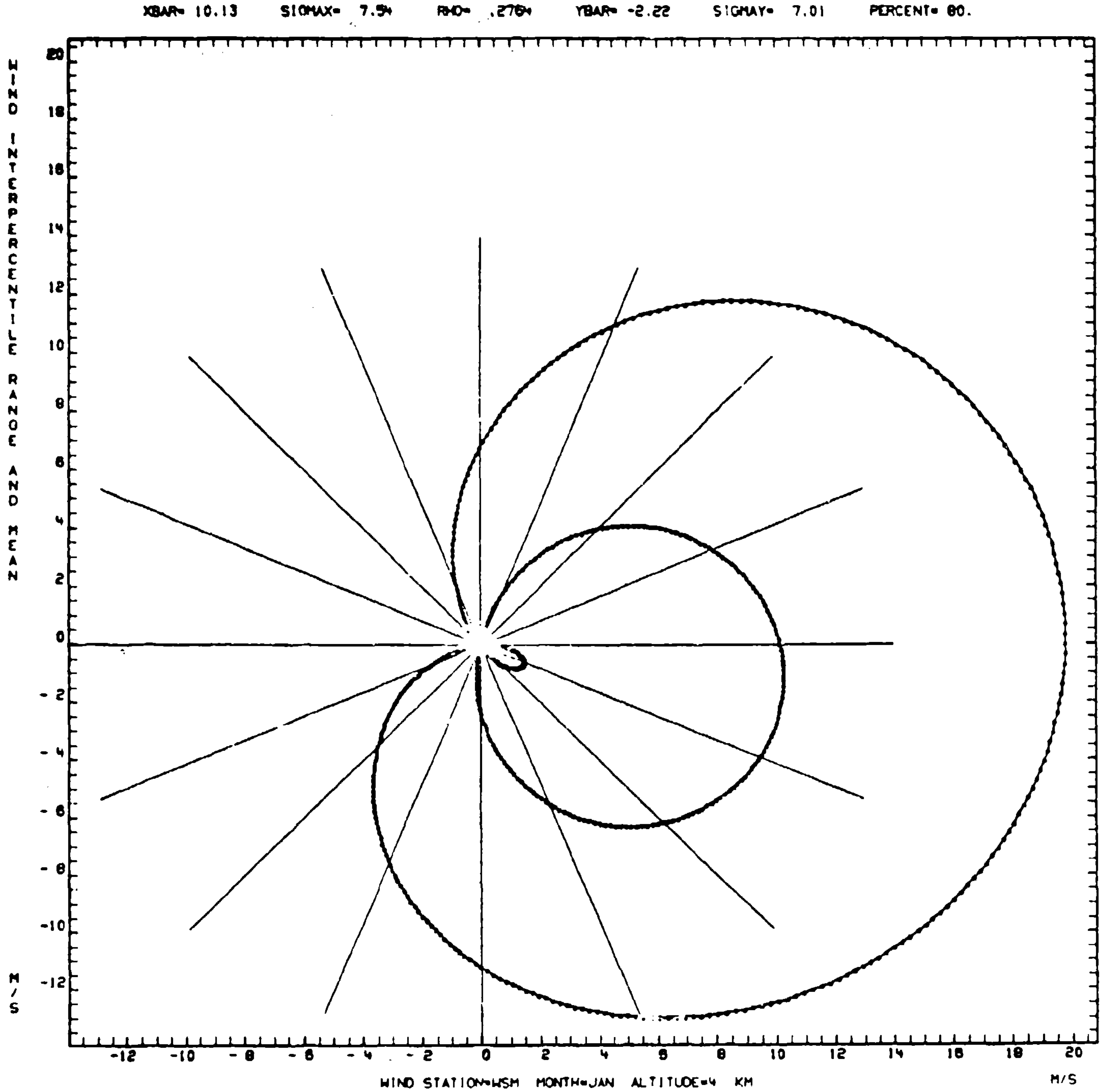

XBAR= 10.13 SIGMAX= 7.54 RHO= .2764 YBAR= -2.22 SIGMAY= 7.01 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-12
-10
-8
-6
-4
-2
0
2
4
6
8
10
12
14
16
18
20
M/S
WIND STATION=WSM MONTH=JAN ALTITUDE=4 KM

Figure A-17.

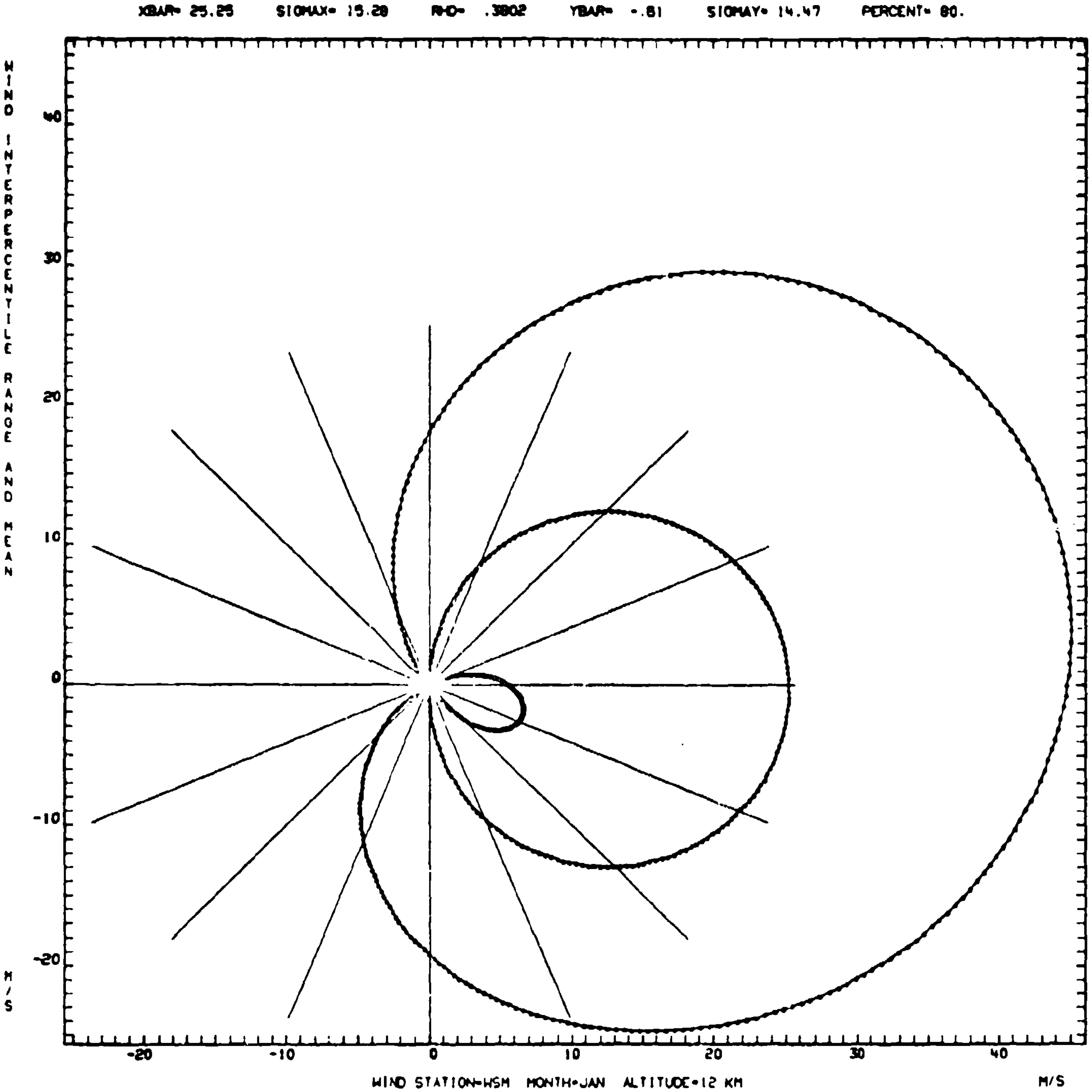

XBAR= 25.25 SIGMAX= 15.28 RHO= .3802 YBAR= -.81 SIGMAY= 14.47 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
40
30
20
10
0
-10
-20
-20
-10
0
10
20
30
40
WIND STATION=WSM MONTH=JAN ALTITUDE=12 KM
M/S

Figure A-18.

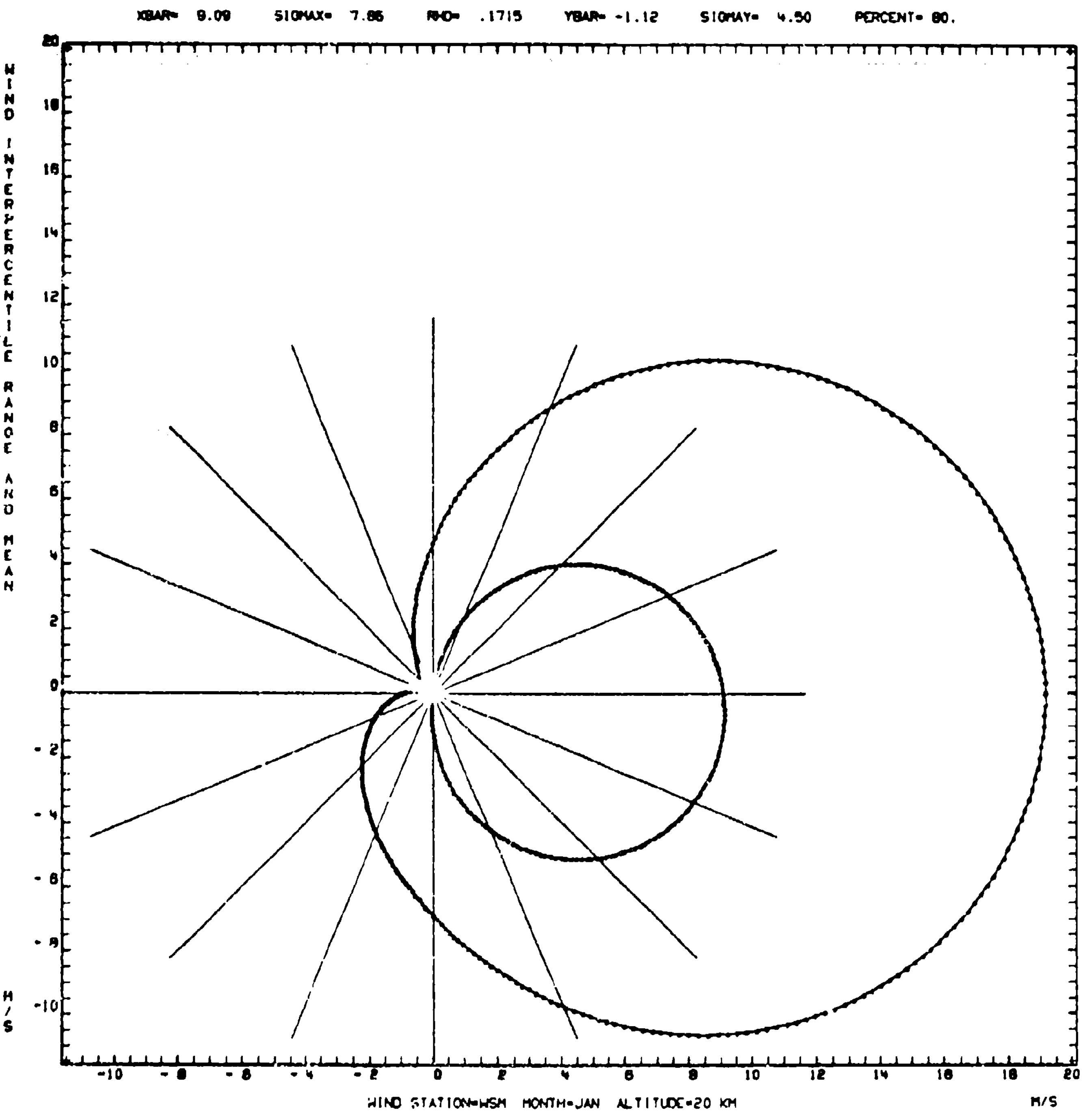

XBAR= 9.09 SIGMAX= 7.86 RHO= .1715 YBAR= -1.12 SIGMAY= 4.50 PERCENT= 90.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
WIND STATION=WSM MONTH=JAN ALTITUDE=20 KM
M/S

Figure A-19.

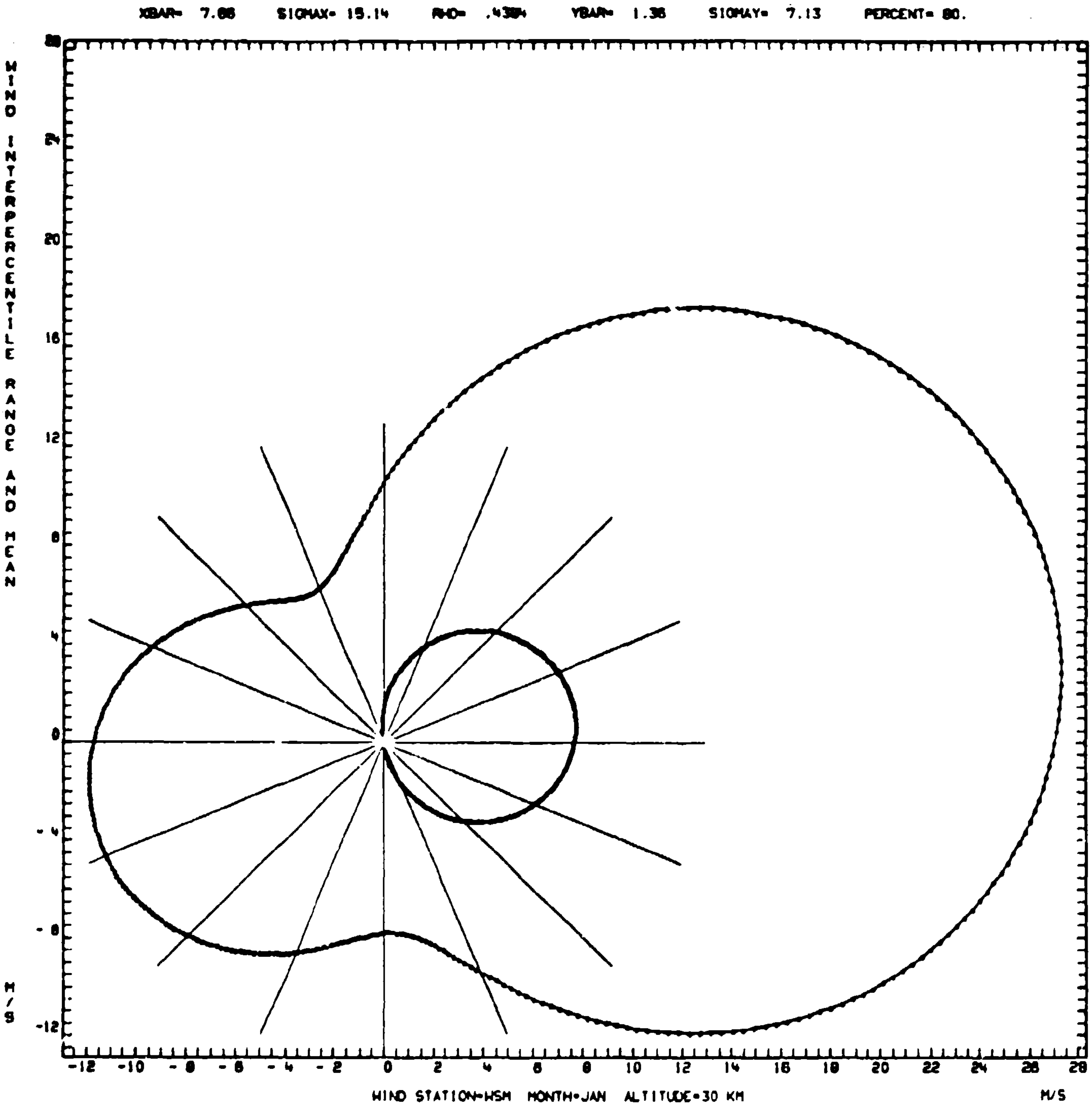

XBAR= 7.88 SIGMAX= 15.14 RHO= .4384 YBAR= 1.38 SIGMAY= 7.13 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN M/S
28
24
20
16
12
8
4
0
-4
-8
-12
-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28
WIND STATION=WSM MONTH=JAN ALTITUDE=30 KM
M/S

Figure A-20.

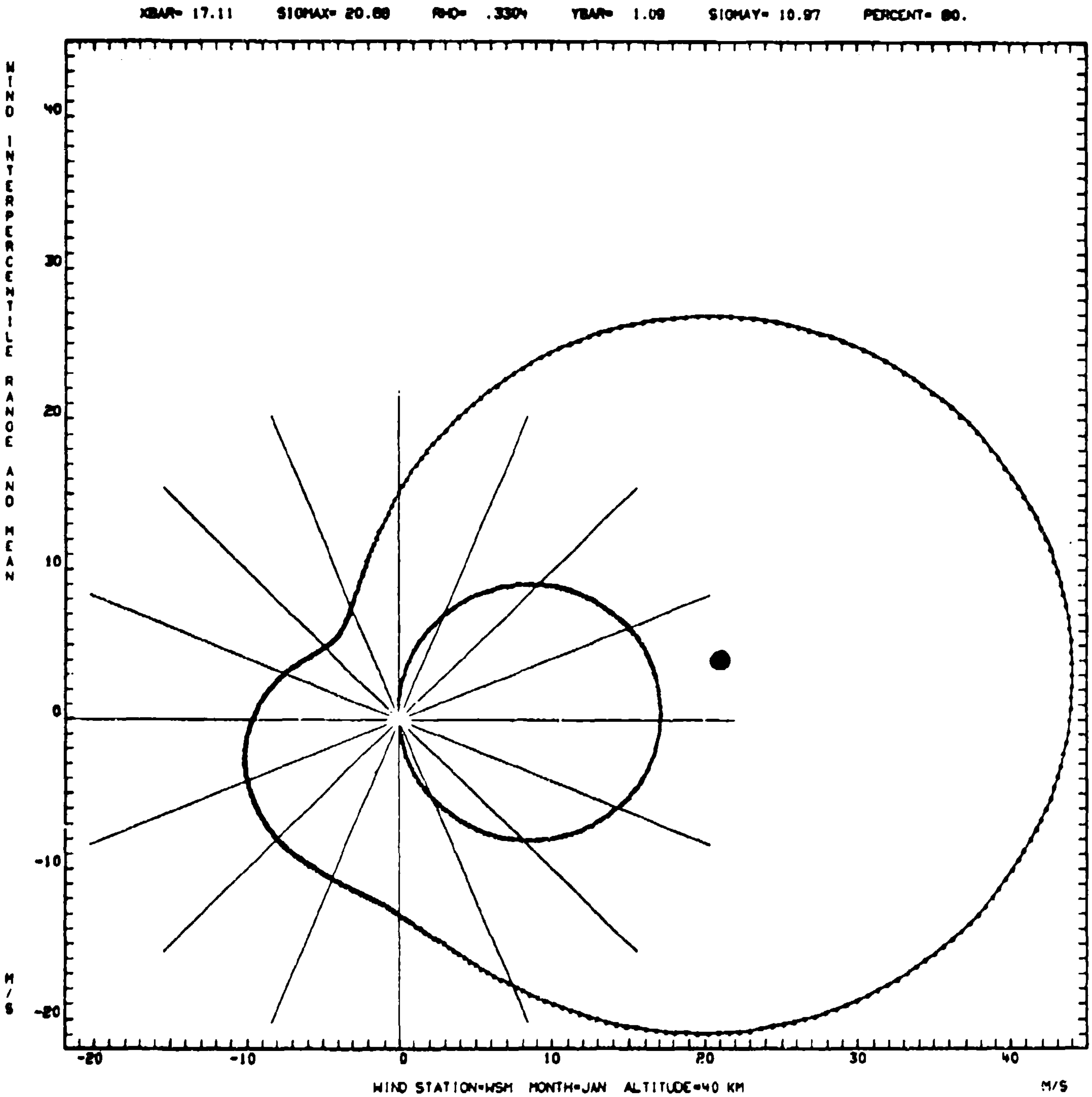

XBAR= 17.11 SIGMAX= 20.88 RHO= .3304 YBAR= 1.09 SIGMAY= 10.97 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
40
30
20
10
0
-10
-20
-20
-10
0
10
20
30
40
WIND STATION=WSM MONTH=JAN ALTITUDE=40 KM
M/S

Figure A-21.

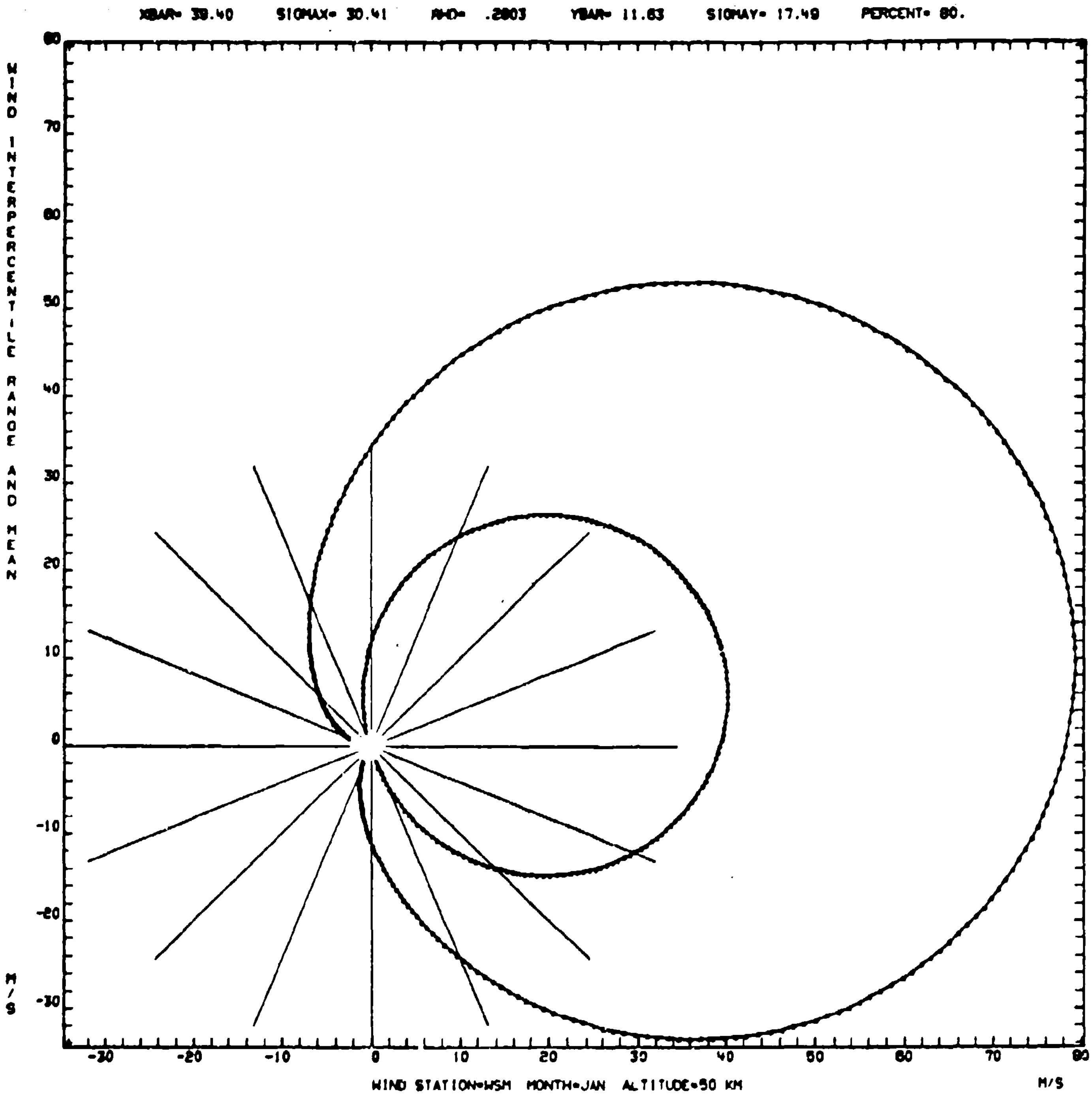
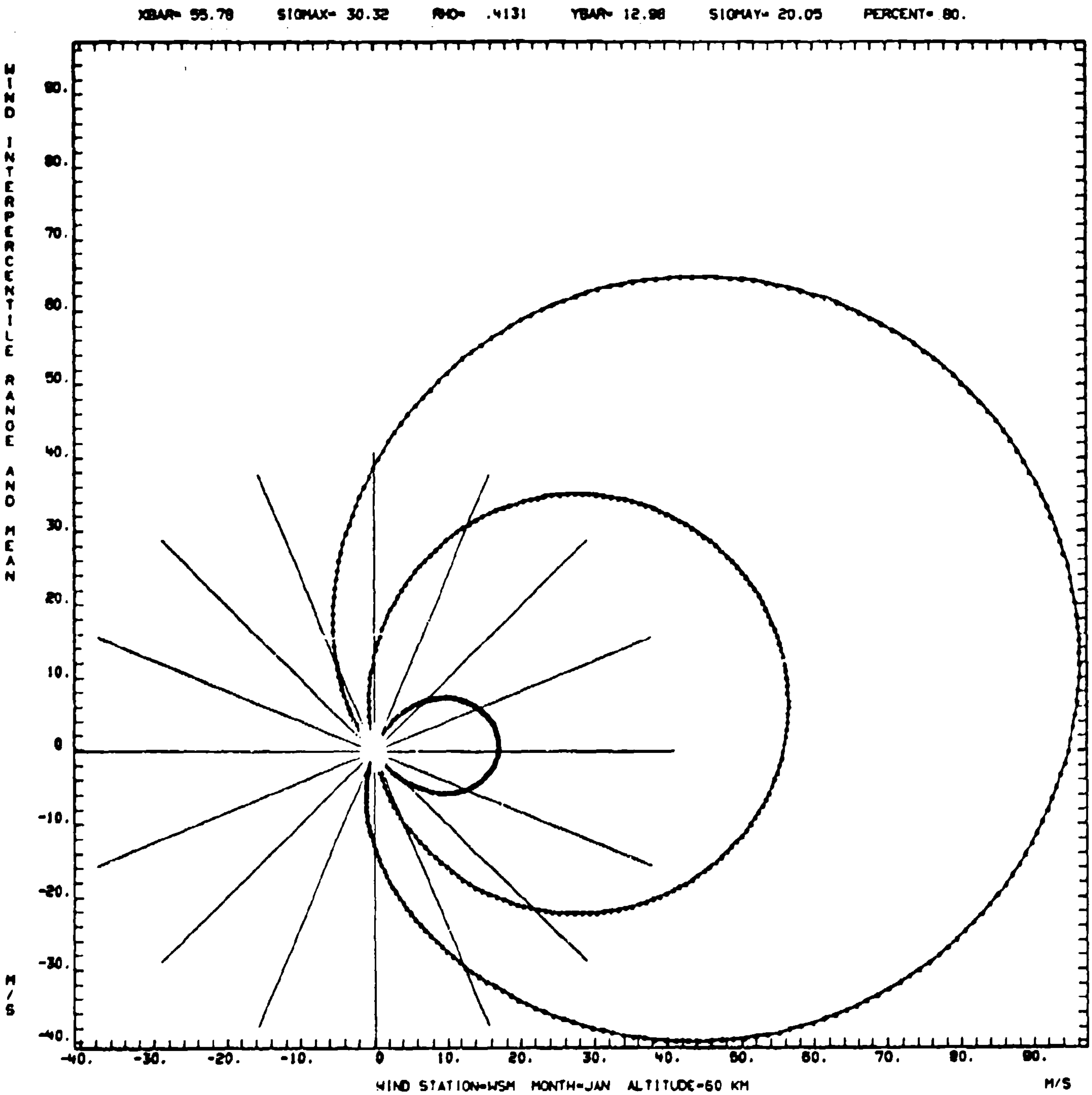

XBAR= 38.40 SIGMAX= 30.41 RHO= .2803 YBAR= 11.63 SIGMAY= 17.49 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
80
70
60
50
40
30
20
10
0
-10
-20
-30
-30
-20
-10
0
10
20
30
40
50
60
70
80
WIND STATION=WSM MONTH=JAN ALTITUDE=50 KM
M/S

Figure A-22.



XBAR= 55.78 SIGMAX= 30.32 RHO= .4131 YBAR= 12.98 SIGMAY= 20.05 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
90. 80. 70. 60. 50. 40. 30. 20. 10. 0 -10. -20. -30. -40.
-40. -30. -20. -10. 0 10. 20. 30. 40. 50. 60. 70. 80. 90.
WIND STATION=WSM MONTH=JAN ALTITUDE=60 KM
M/S

Figure A-23.

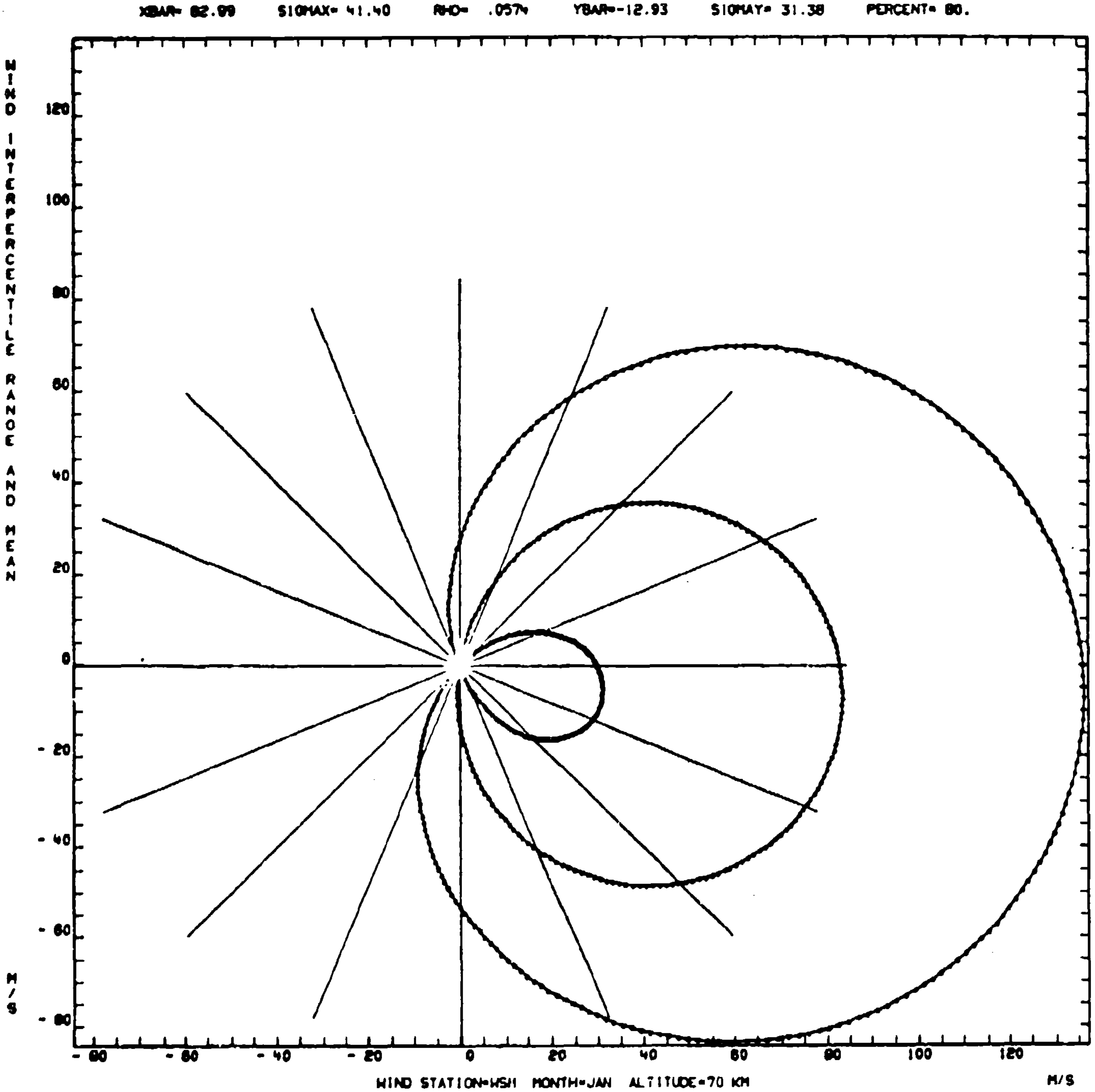
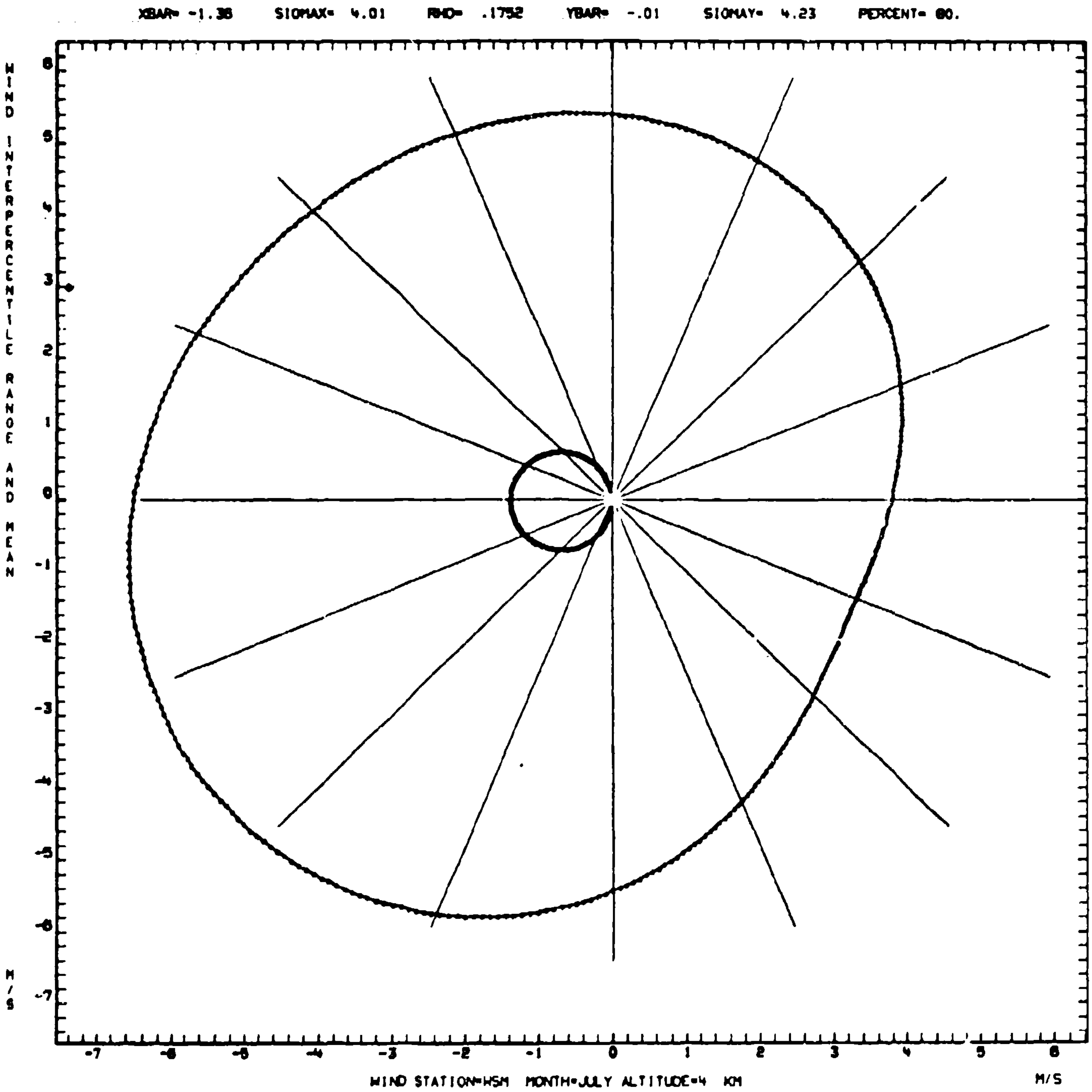

XBAR= 82.99 SIGMAX= 41.40 RHO= .0574 YBAR=-12.93 SIGMAY= 31.38 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
120
100
80
60
40
20
0
-20
-40
-60
-80
-80 -60 -40 -20 0 20 40 60 80 100 120
WIND STATION=WSH MONTH=JAN ALTITUDE=70 KM
M/S

Figure A-24.



XBAR= -1.38 SIGMAX= 4.01 RHO= .1752 YBAR= -.01 SIGMAY= 4.23 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
WIND STATION=HSM MONTH=JULY ALTITUDE=4 KM
M/S

Figure A-25.

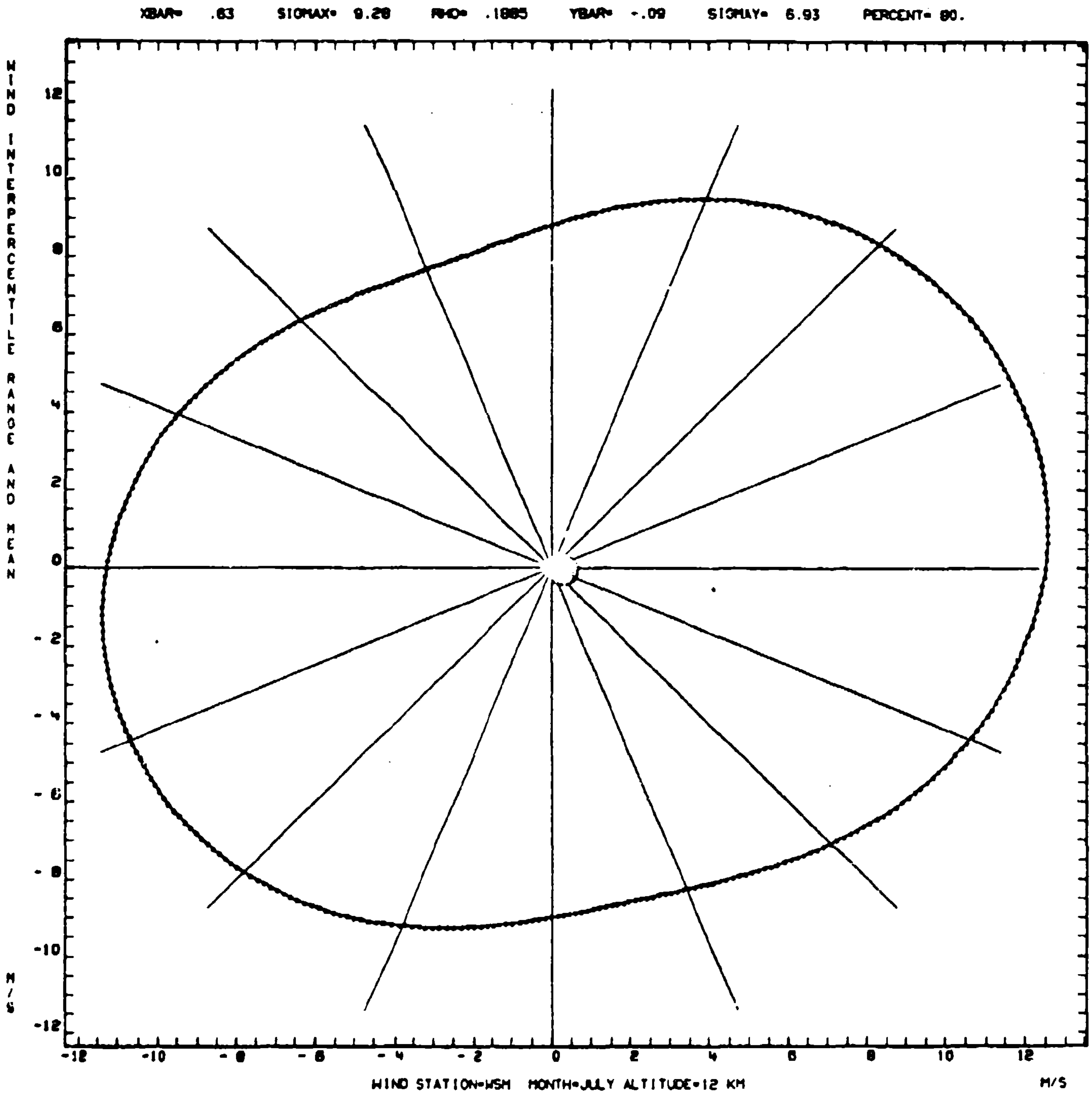

XBAR= .63 SIGMAX= 9.28 RHO= .1885 YBAR= -.09 SIGMAY= 6.93 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
WIND STATION=WSM MONTH=JULY ALTITUDE=12 KM
M/S

Figure A-26.

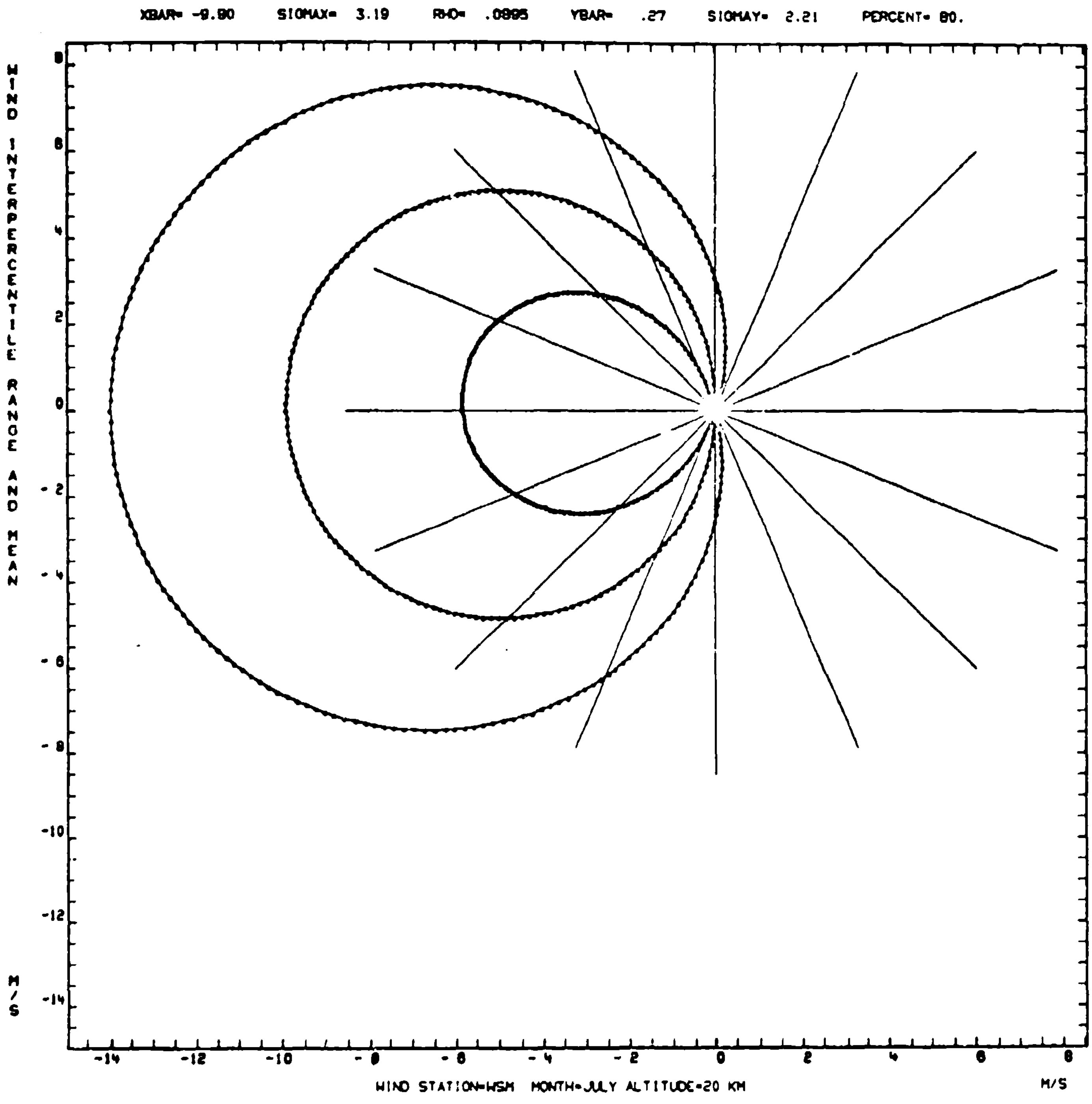

XBAR= -9.80 SIGMAX= 3.19 RHO= .0895 YBAR= .27 SIGMAY= 2.21 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-14
-12
-10
-8
-6
-4
-2
0
2
4
6
8
WIND STATION=WSM MONTH=JULY ALTITUDE=20 KM
M/S

Figure A-27.

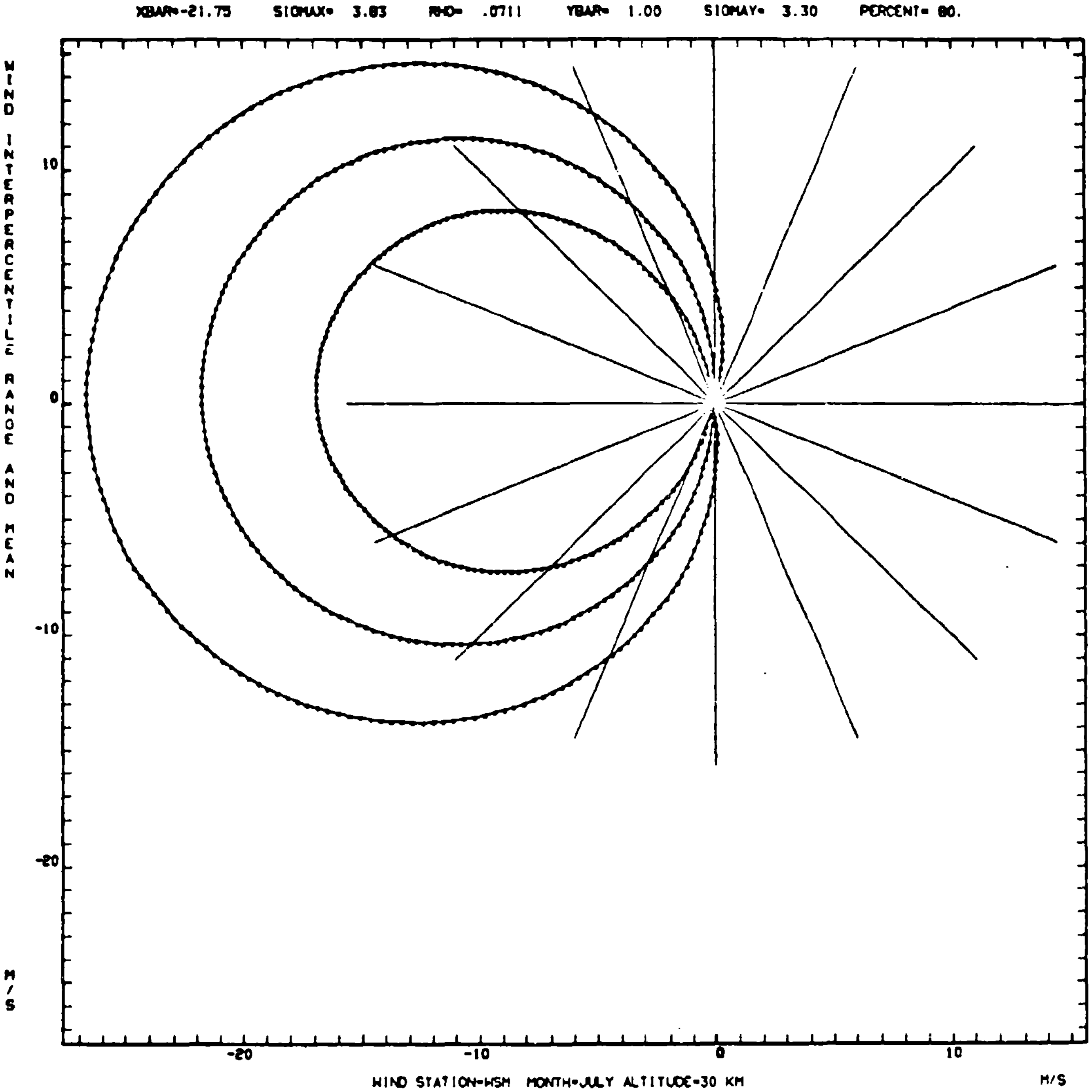

XBAR=-21.75 SIGMAX= 3.83 RHO= .0711 YBAR= 1.00 SIGMAY= 3.30 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN M/S
10
0
-10
-20
-20
-10
0
10
WIND STATION=WSM MONTH=JULY ALTITUDE=30 KM
M/S

Figure A-28.

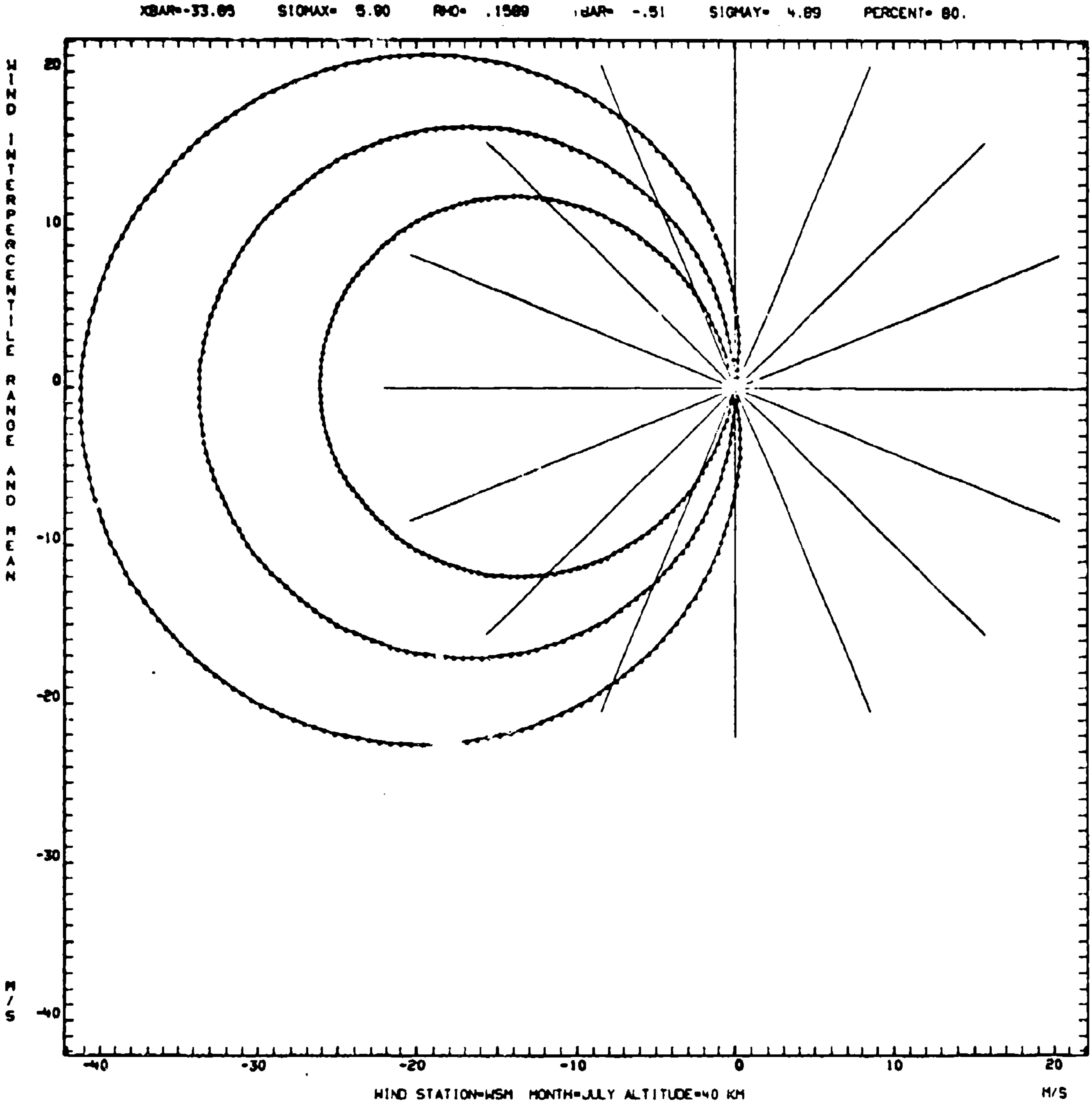

XBAR=-33.05 SIGMAX= 5.90 RHO= .1589 YBAR= -.51 SIGMAY= 4.89 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
20
10
0
-10
-20
-30
-40
-40
-30
-20
-10
0
10
20
WIND STATION=WSM MONTH=JULY ALTITUDE=40 KM
M/S

Figure A-29.

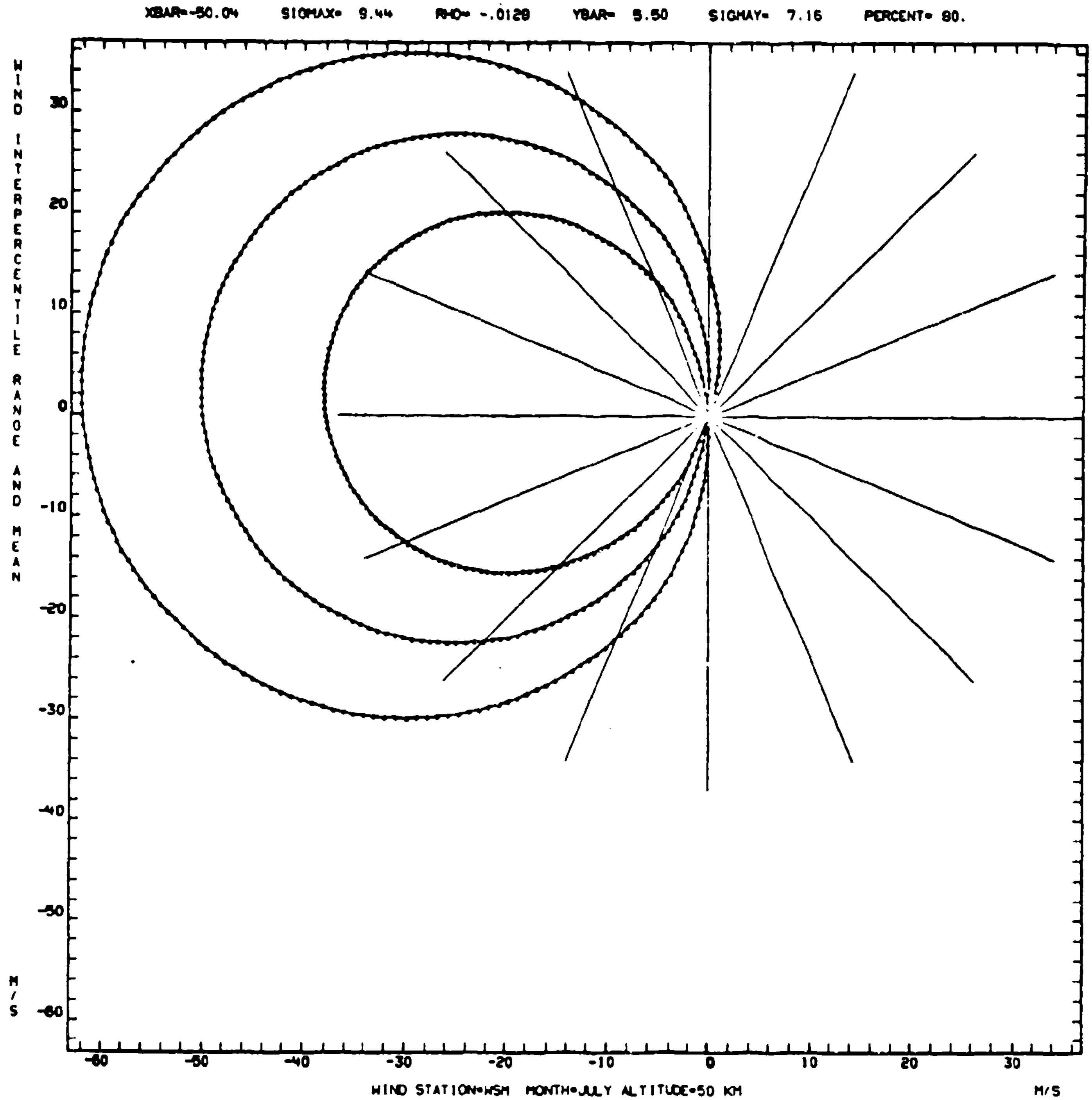

XBAR=-50.04 SIGMAX= 9.44 RHO= -.0128 YBAR= 5.50 SIGMAY= 7.16 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
30
20
10
0
-10
-20
-30
-40
-50
-60
-60 -50 -40 -30 -20 -10 0 10 20 30
WIND STATION=WSM MONTH=JULY ALTITUDE=50 KM
M/S

Figure A-30.

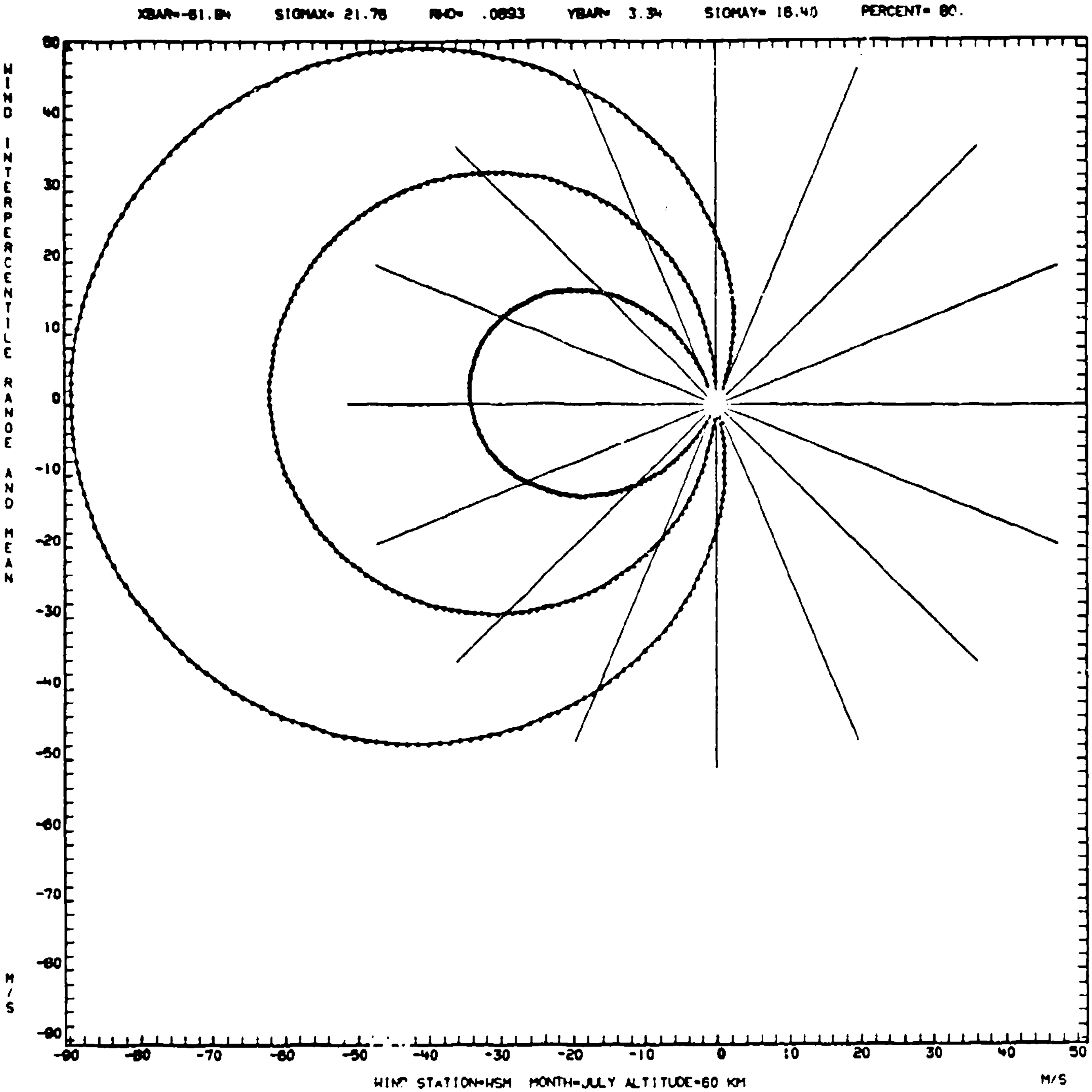

XBAR=-61.84 SIGMAX= 21.78 RHO= .0893 YBAR= 3.34 SIGMAY= 18.40 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
WIND STATION=HSM MONTH=JULY ALTITUDE=60 KM
M/S

Figure A-31.

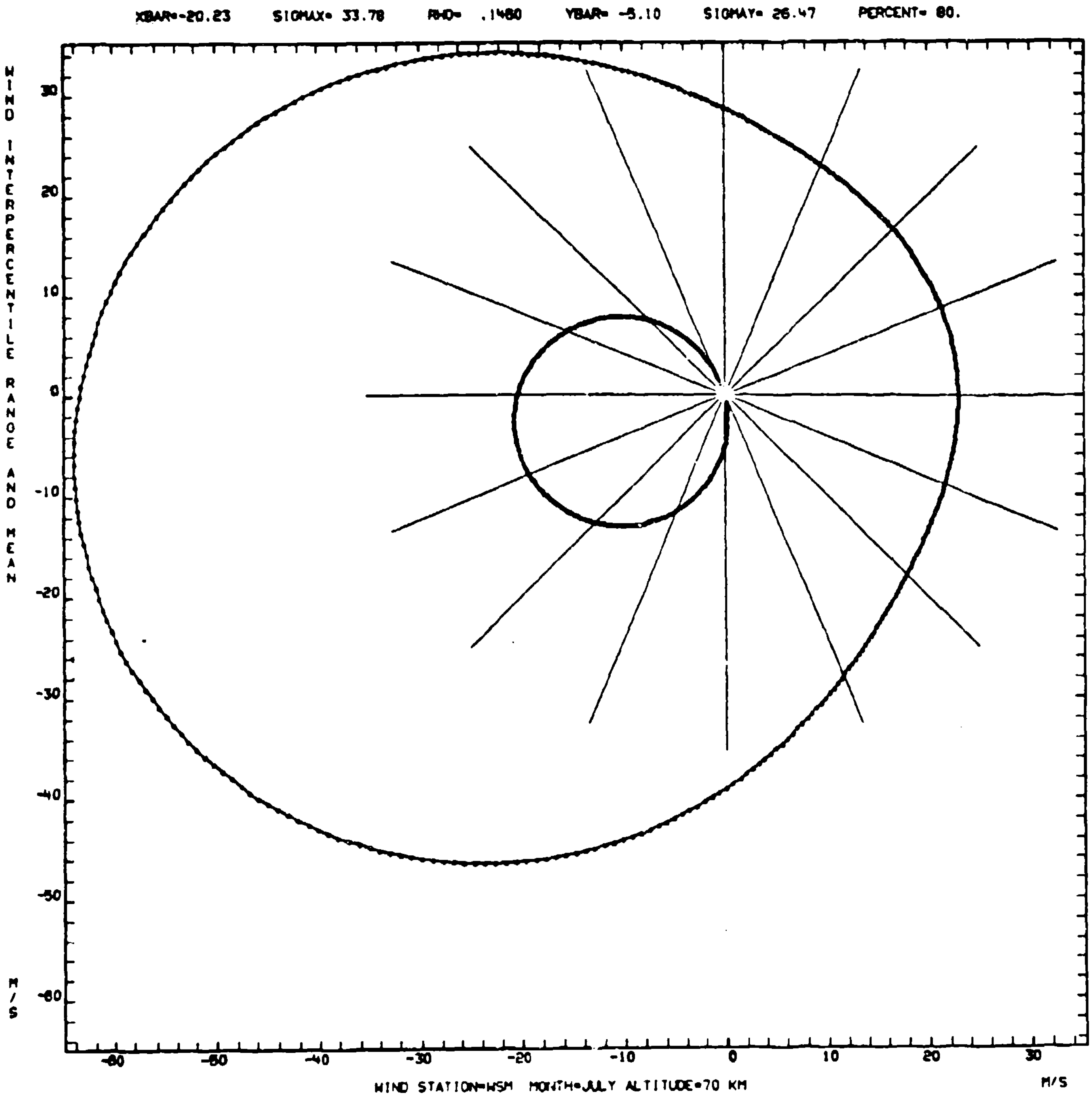
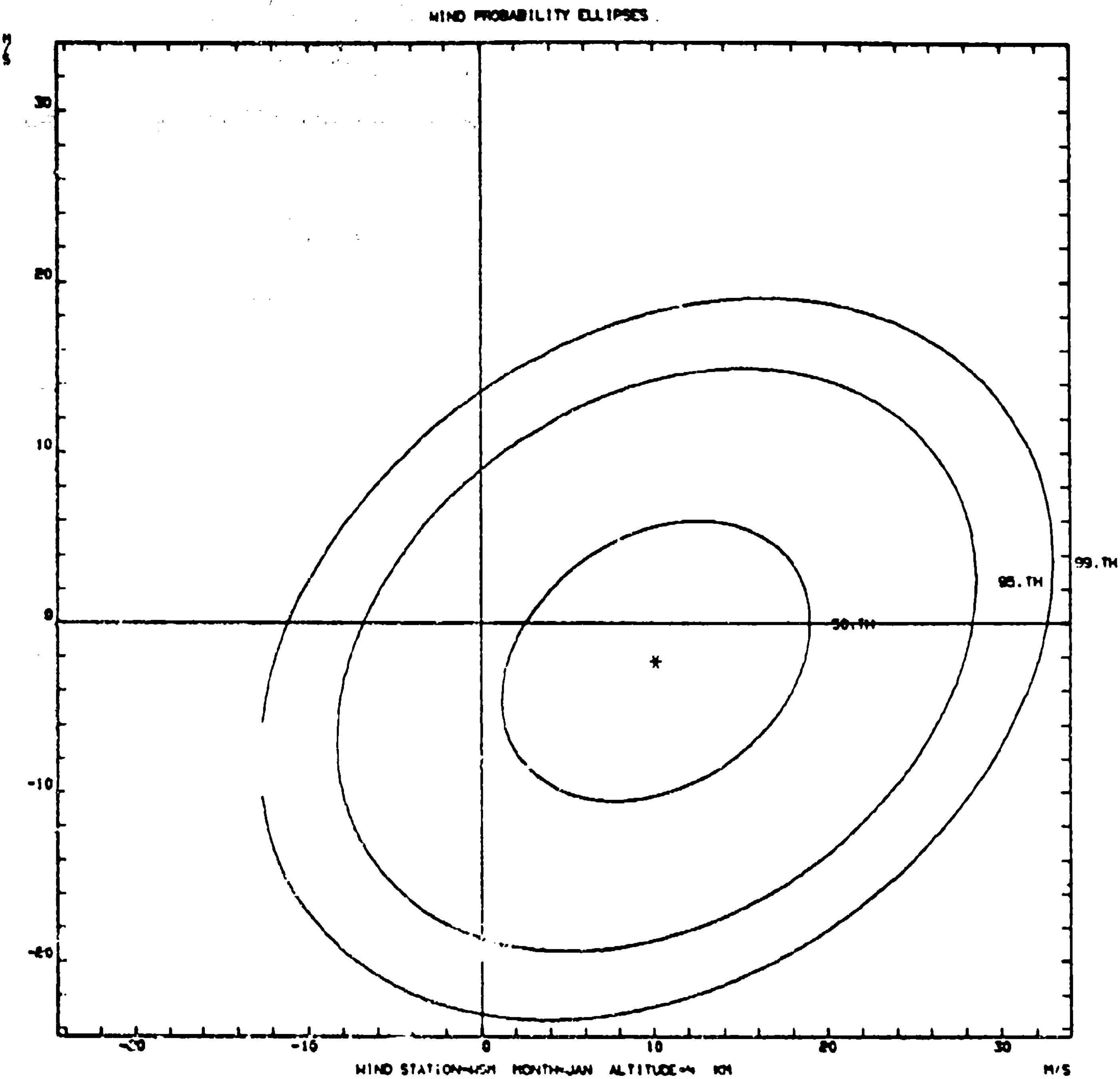

XBAR=-20.23 SIGMAX= 33.78 RHO= .1480 YBAR= -5.10 SIGMAY= 26.47 PERCENT= 80.
WIND INTERPERCENTILE RANGE AND MEAN
M/S
30
20
10
0
-10
-20
-30
-40
-50
-60
-60
-50
-40
-30
-20
-10
0
10
20
30
WIND STATION=WSM MONTH=JULY ALTITUDE=70 KM
M/S

Figure A-32.



WIND PROBABILITY ELLIPSES
M/S
30
20
10
0
-10
-20
-20
-10
0
10
20
30
99.TH
95.TH
50.TH
M/S

Figure A-33.

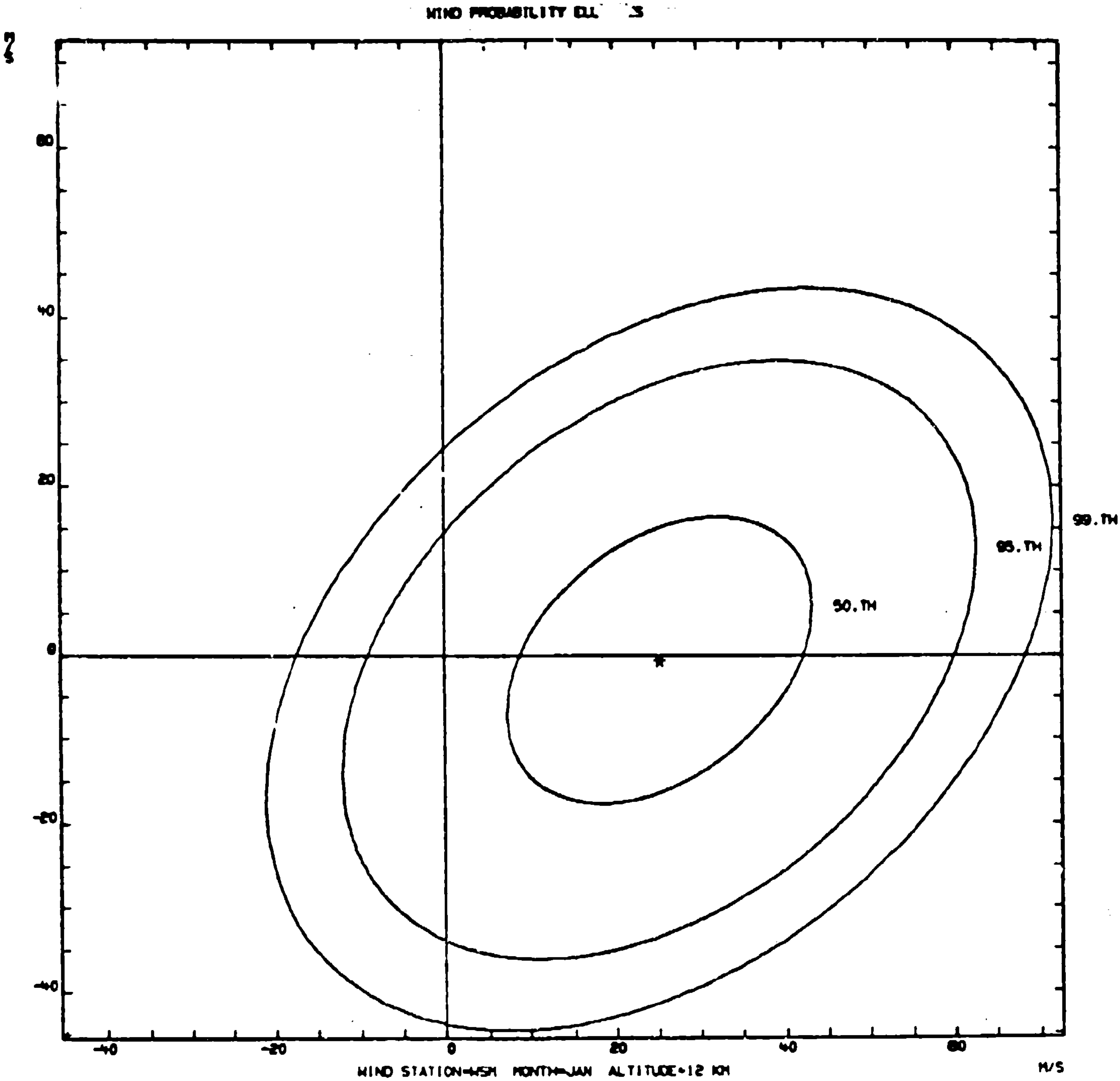

WIND PROBABILITY ELL S
M/S
60
40
20
0
-20
-40
50.TH
95.TH
99.TH
-40
-20
0
20
40
60
WIND STATION=WSM MONTH=JAN ALTITUDE=12 KM
M/S

Figure A-34.

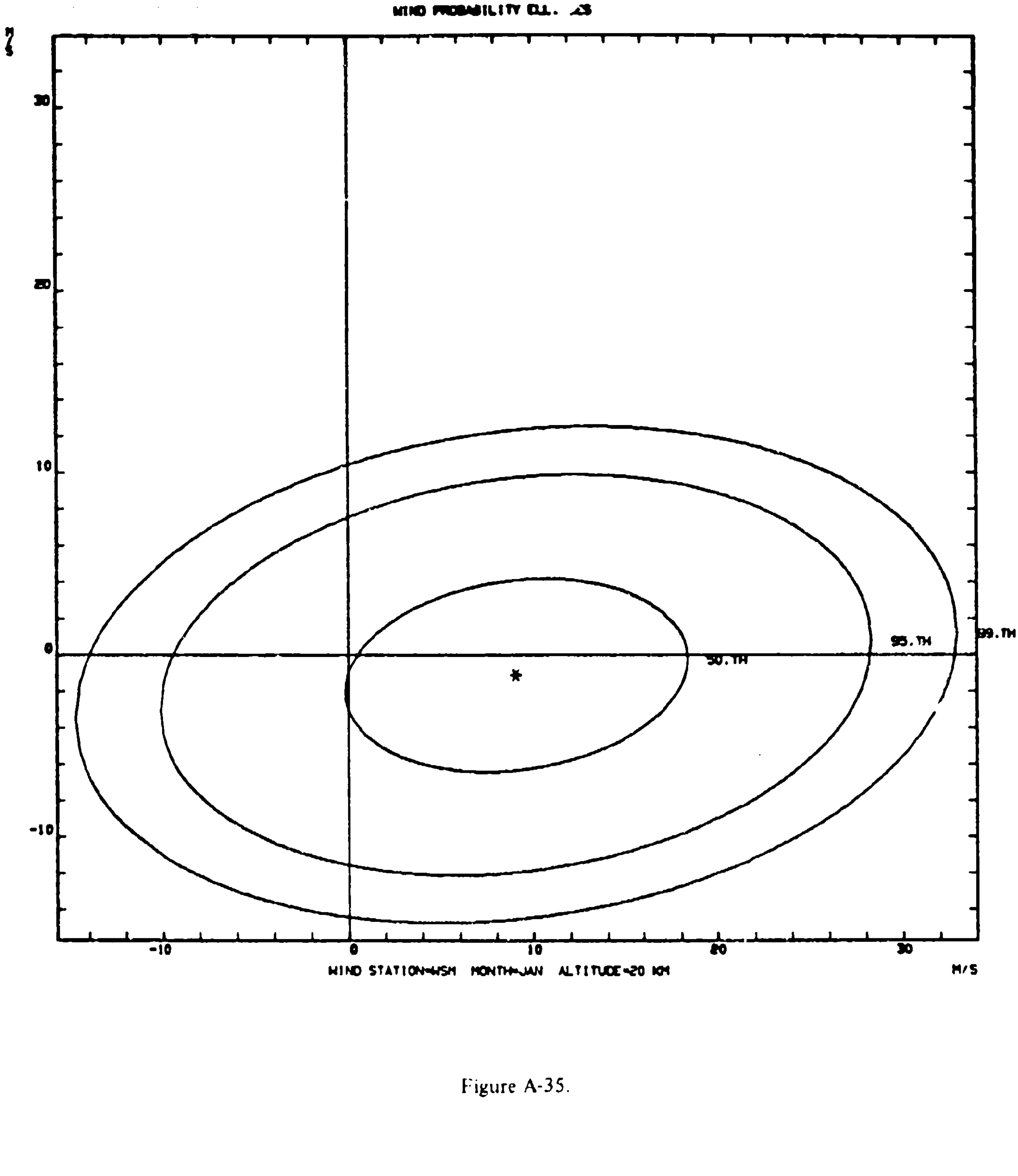

WIND PROBABILITY ELL. ES
M/S
30
20
10
0
-10
-10
0
10
20
30
M/S
50.TH
95.TH
99.TH
WIND STATION=WSM MONTH=JAN ALTITUDE=20 KM

Figure A-35.

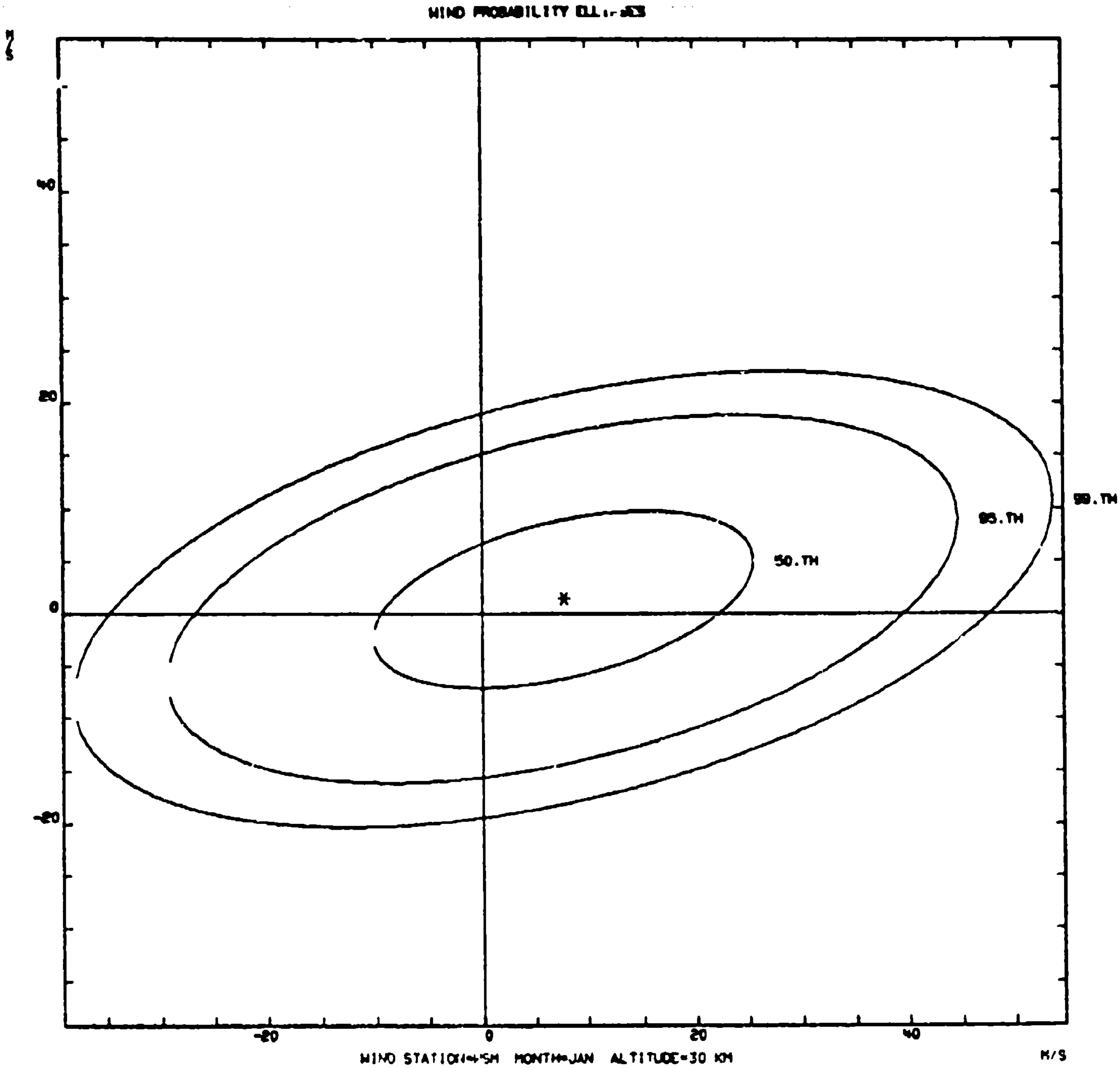

WIND PROBABILITY ELLIPSES
M/S
40
20
0
-20
50.TH
95.TH
99.TH
-20
0
20
40
WIND STATION=45M MONTH=JAN ALTITUDE=30 KM
M/S

Figure A-36.

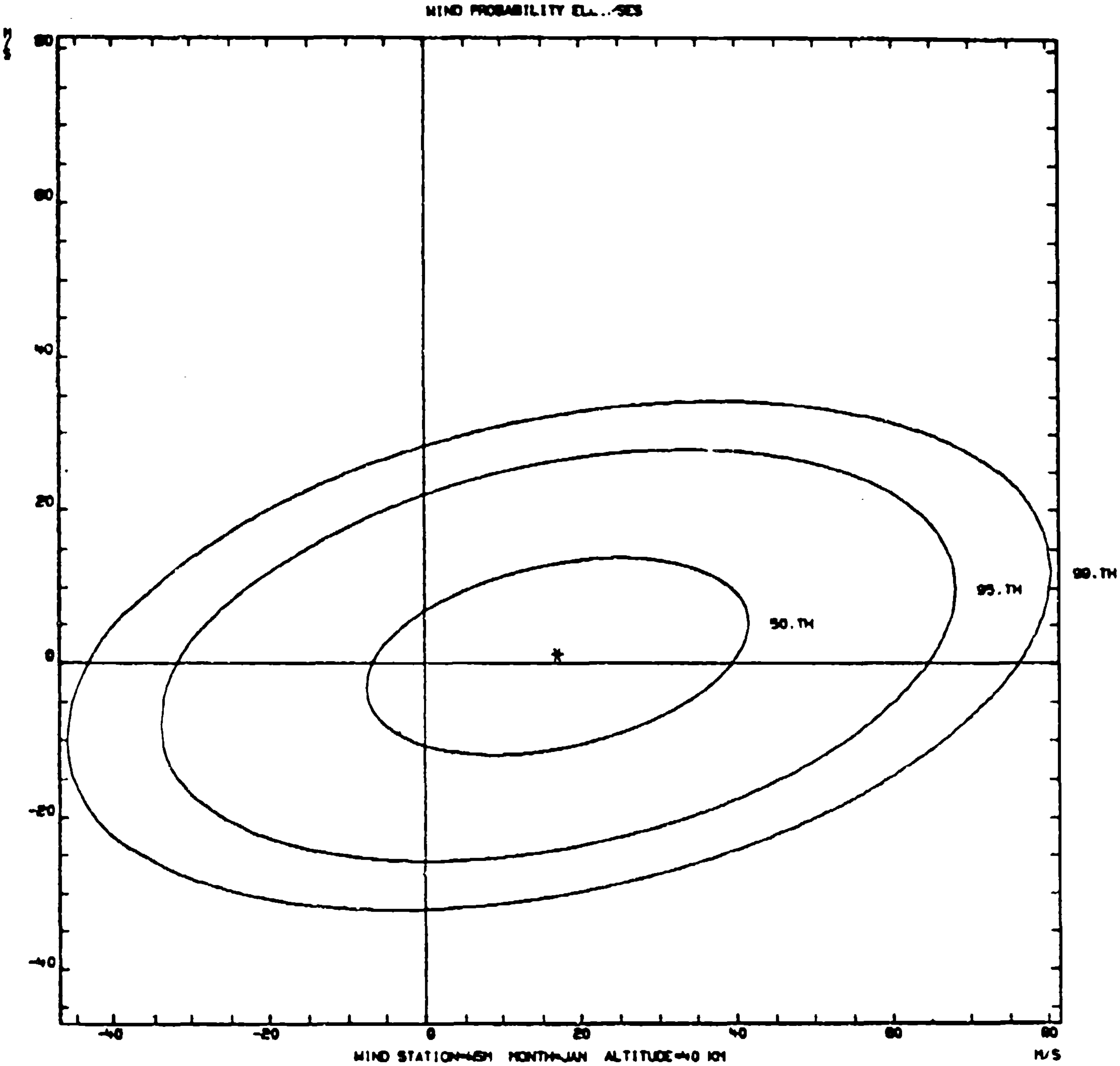

WIND PROBABILITY ELLIPSES
M/S
80
60
40
20
0
-20
-40
-40
-20
0
20
40
60
80
99.TH
95.TH
50.TH
WIND STATION=WSM MONTH=JAN ALTITUDE=40 KM
M/S

Figure A-37.

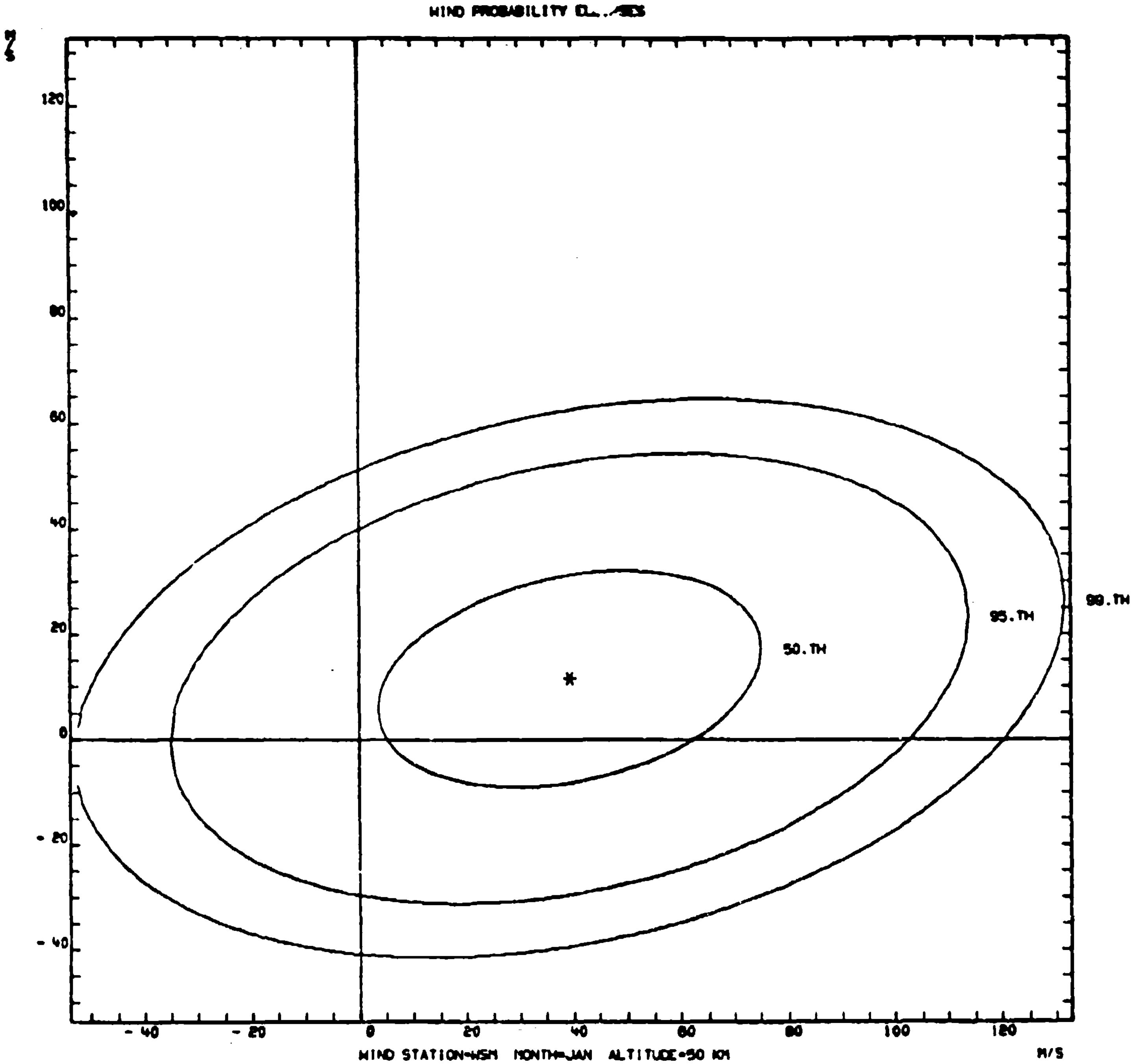

WIND PROBABILITY EL..ASES
M/S
120
100
80
60
40
20
0
- 20
- 40
50.TH
95.TH
99.TH
- 40
- 20
0
20
40
60
80
100
120
WIND STATION=WSM MONTH=JAN ALTITUDE=50 KM
M/S

Figure A-38.

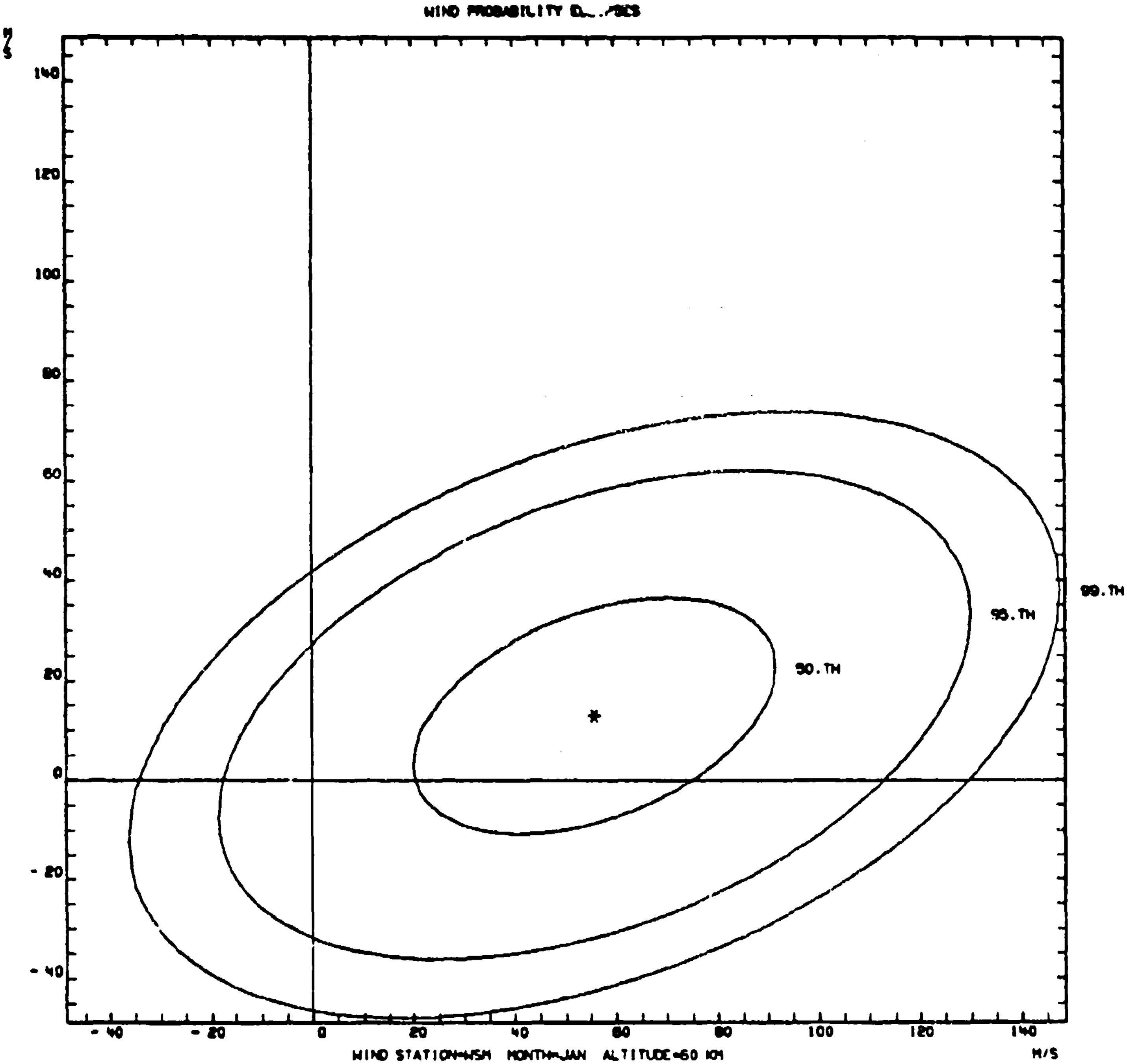

WIND PROBABILITY ELLIPSES
M/S
140
120
100
80
60
40
20
0
- 20
- 40
- 40
- 20
0
20
40
60
80
100
120
140
WIND STATION=WSM MONTH=JAN ALTITUDE=60 KM
M/S
50.TH
95.TH
99.TH

Figure A-39.

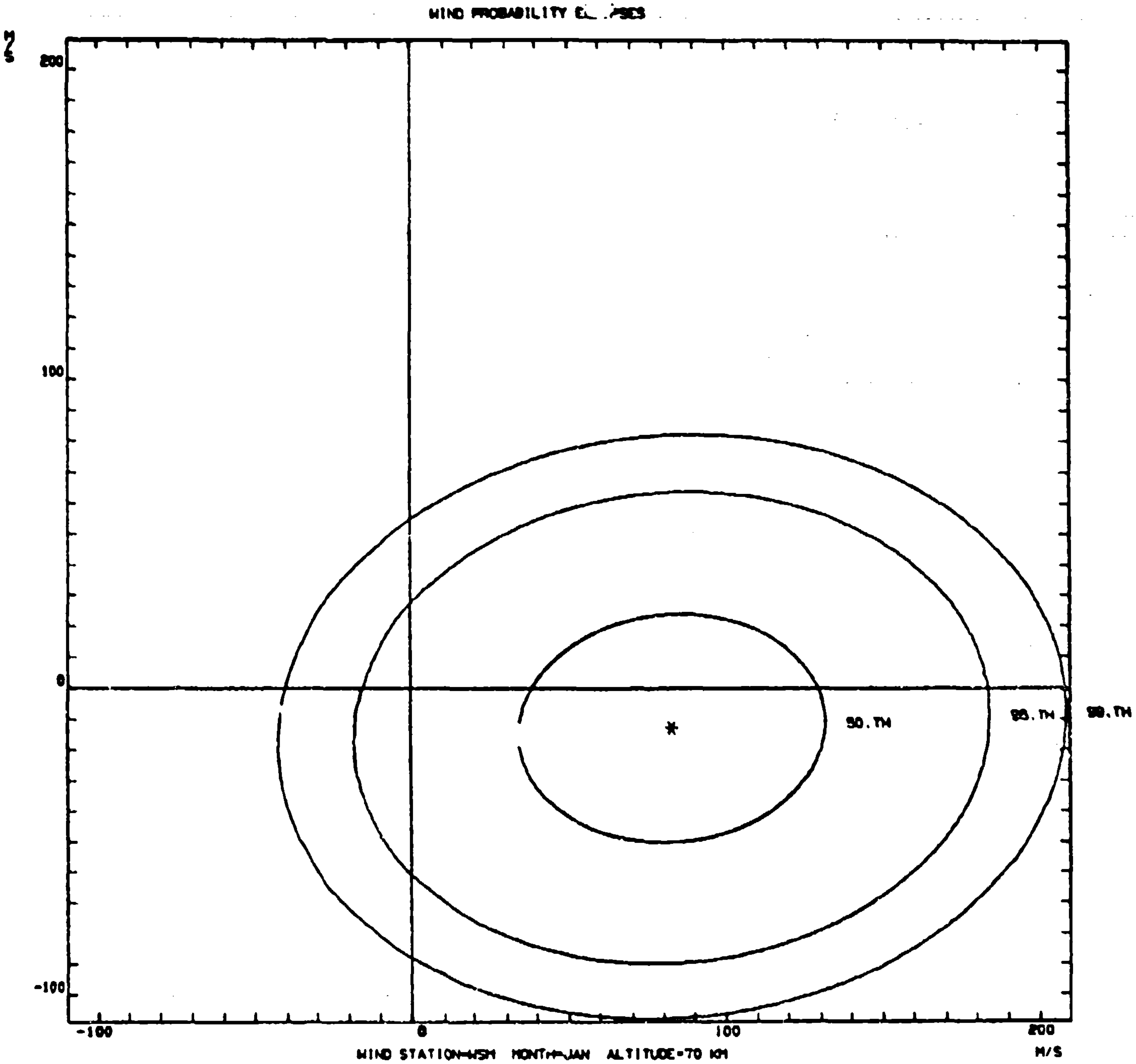

WIND PROBABILITY EL...PSES
M/S
200
100
0
-100
-100
0
100
200
50.TH
95.TH
99.TH
WIND STATION=WSM MONTH=JAN ALTITUDE=70 KM
M/S

Figure A-40.

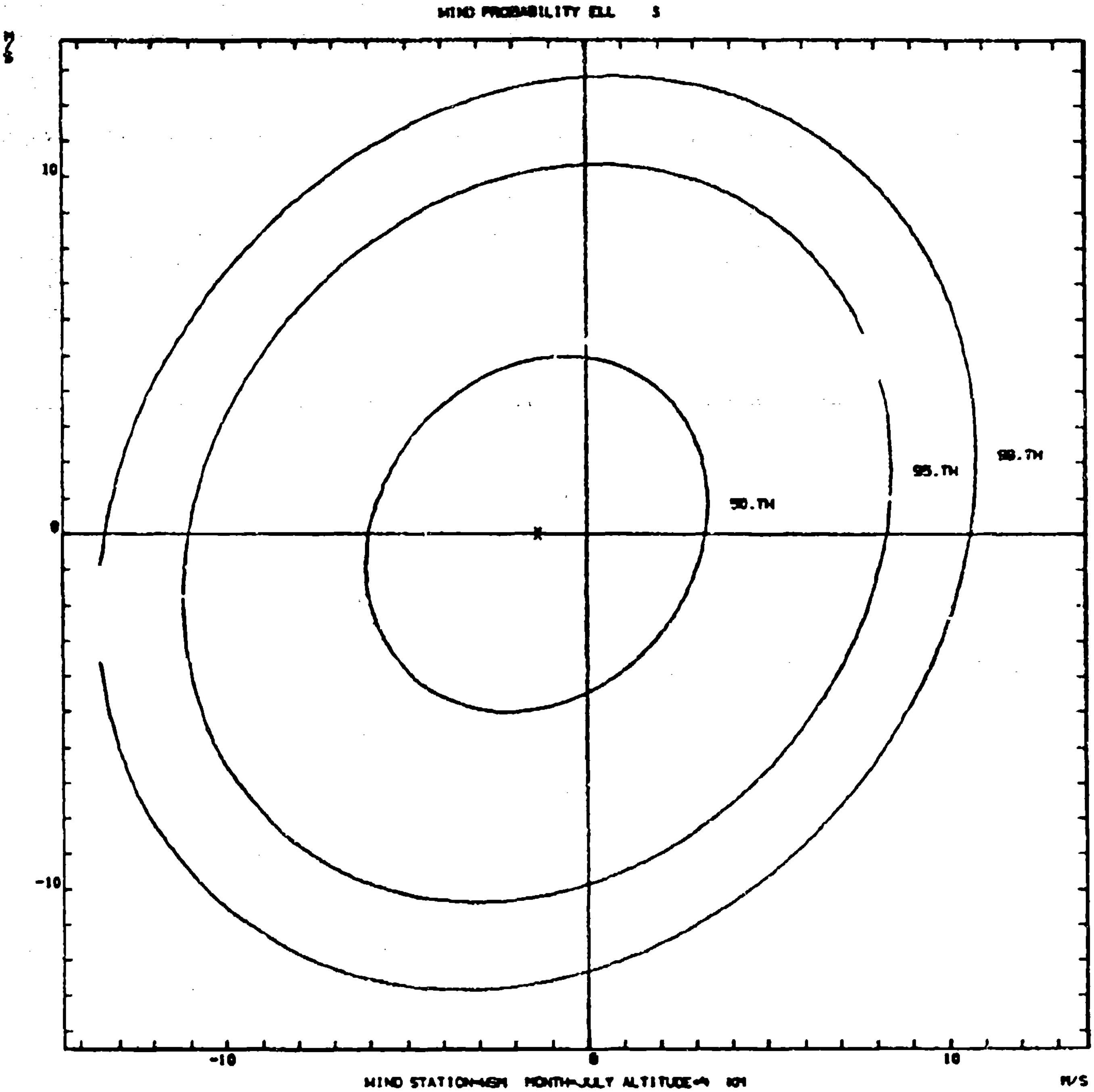

WIND PROBABILITY ELL S
M/S
10
0
-10
50.TH
95.TH
99.TH
-10
0
10
WIND STATION=WSM MONTH=JULY ALTITUDE=4 KM
M/S

Figure A-41.

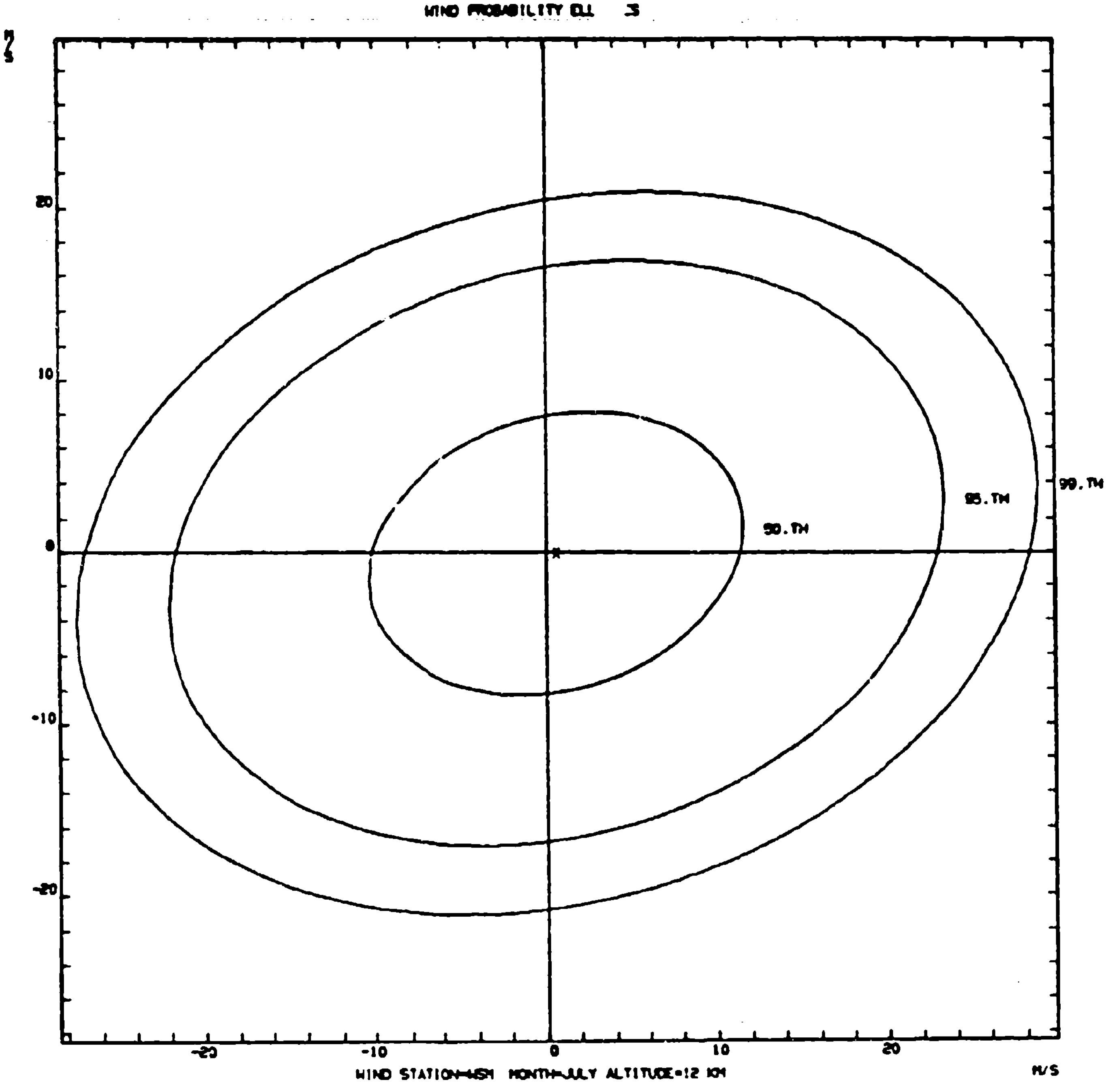

WIND PROBABILITY ELL S
M/S
20
10
0
-10
-20
90.TH
95.TH
99.TH
-20
-10
0
10
20
WIND STATION=WSM MONTH=JULY ALTITUDE=12 KM
M/S

Figure A-42.

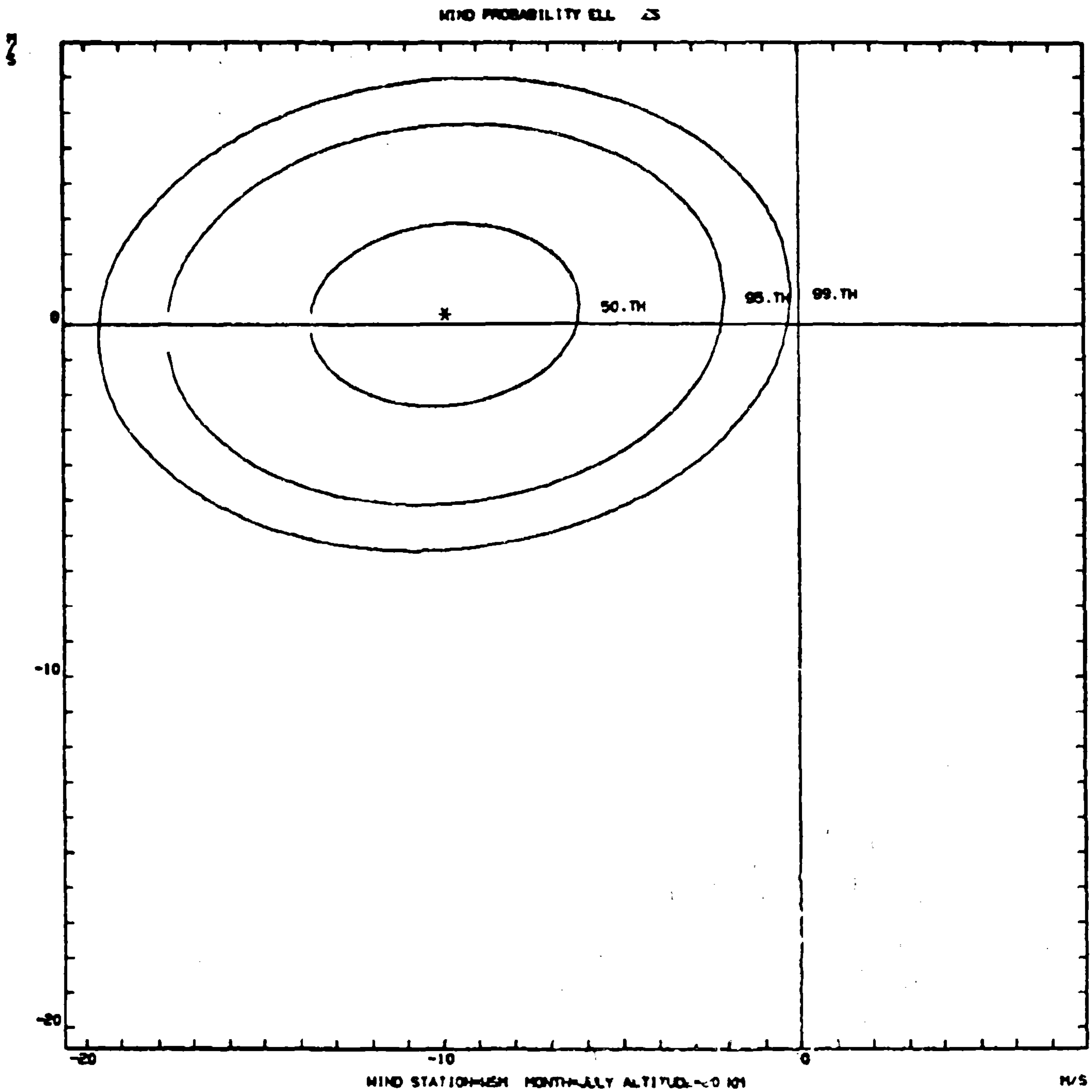
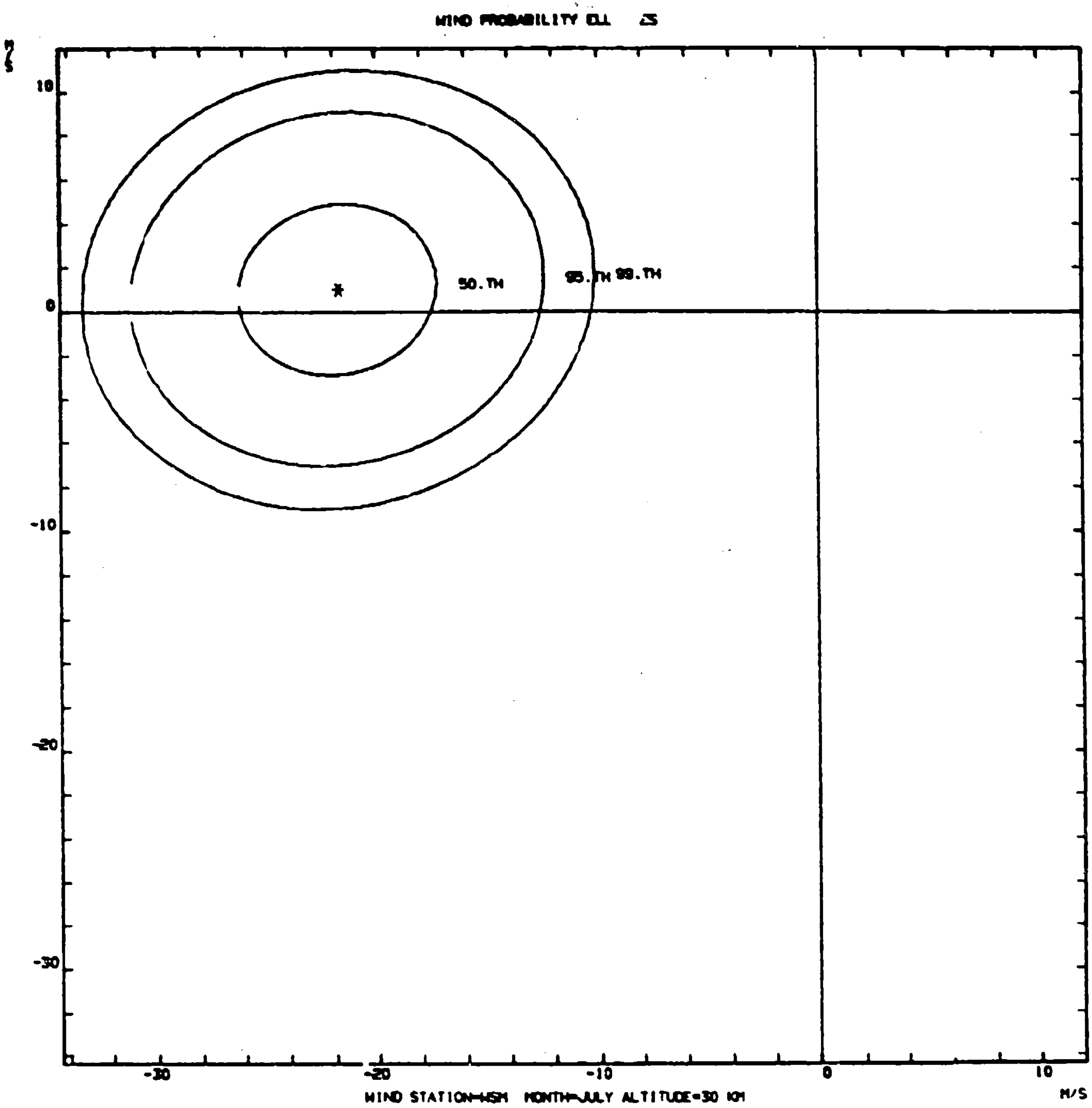

WIND PROBABILITY ELL [illegible]S
50.TH
95.TH
99.TH
0
-10
-20
-20
-10
0
WIND STATION=WSM MONTH=JULY ALTITUDE=20 KM
M/S

Figure A-43.



WIND PROBABILITY ELL
M/S
10
0
-10
-20
-30
50.TH
95.TH
99.TH
-30
-20
-10
0
10
M/S
WIND STATION=WSM MONTH=JULY ALTITUDE=30 KM

Figure A-44.

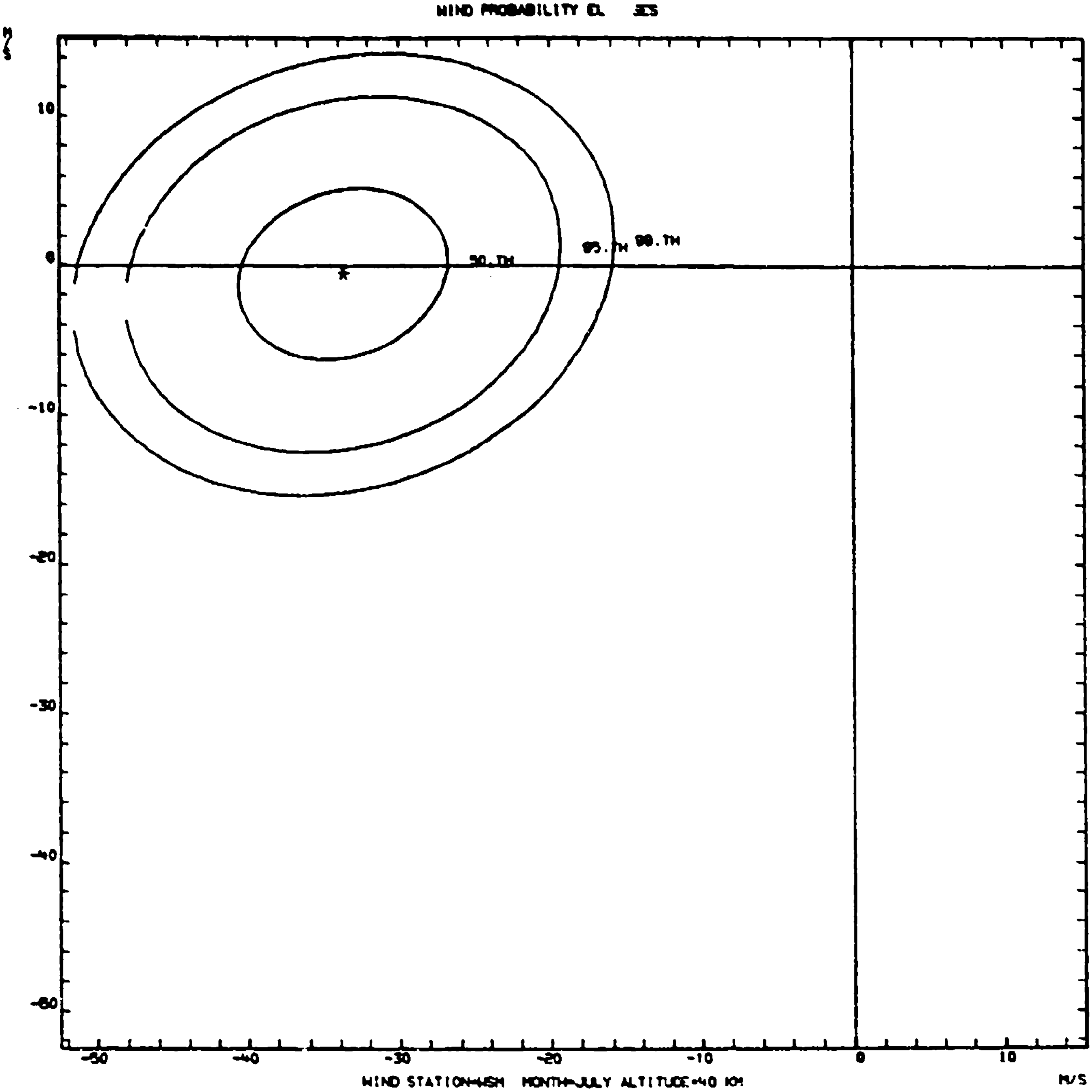

WIND PROBABILITY EL SES
M/S
10
0
-10
-20
-30
-40
-50
50.TH
95.TH
99.TH
-50
-40
-30
-20
-10
0
10
WIND STATION=WSM MONTH=JULY ALTITUDE=40 KM
M/S

Figure A-45.

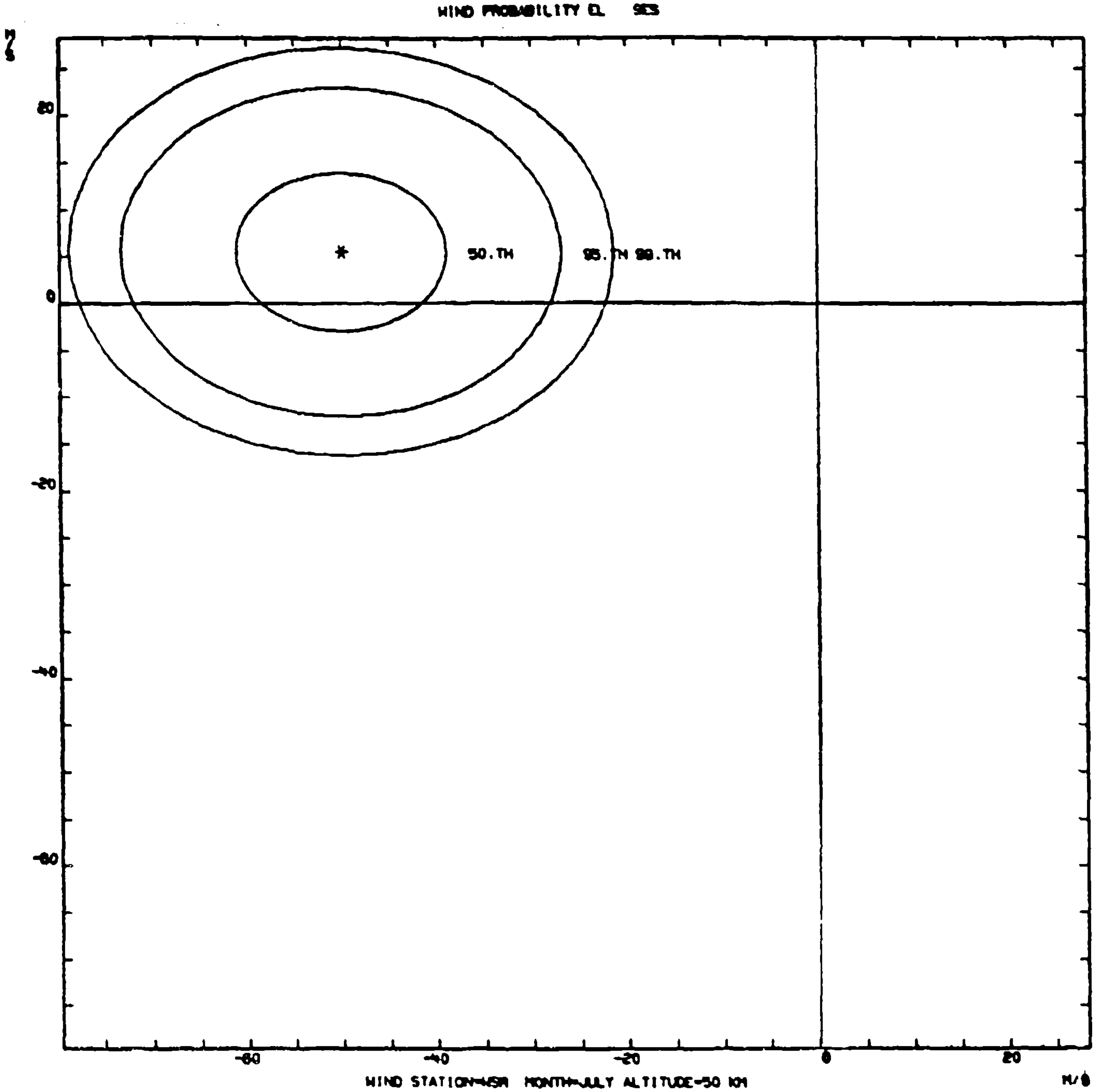
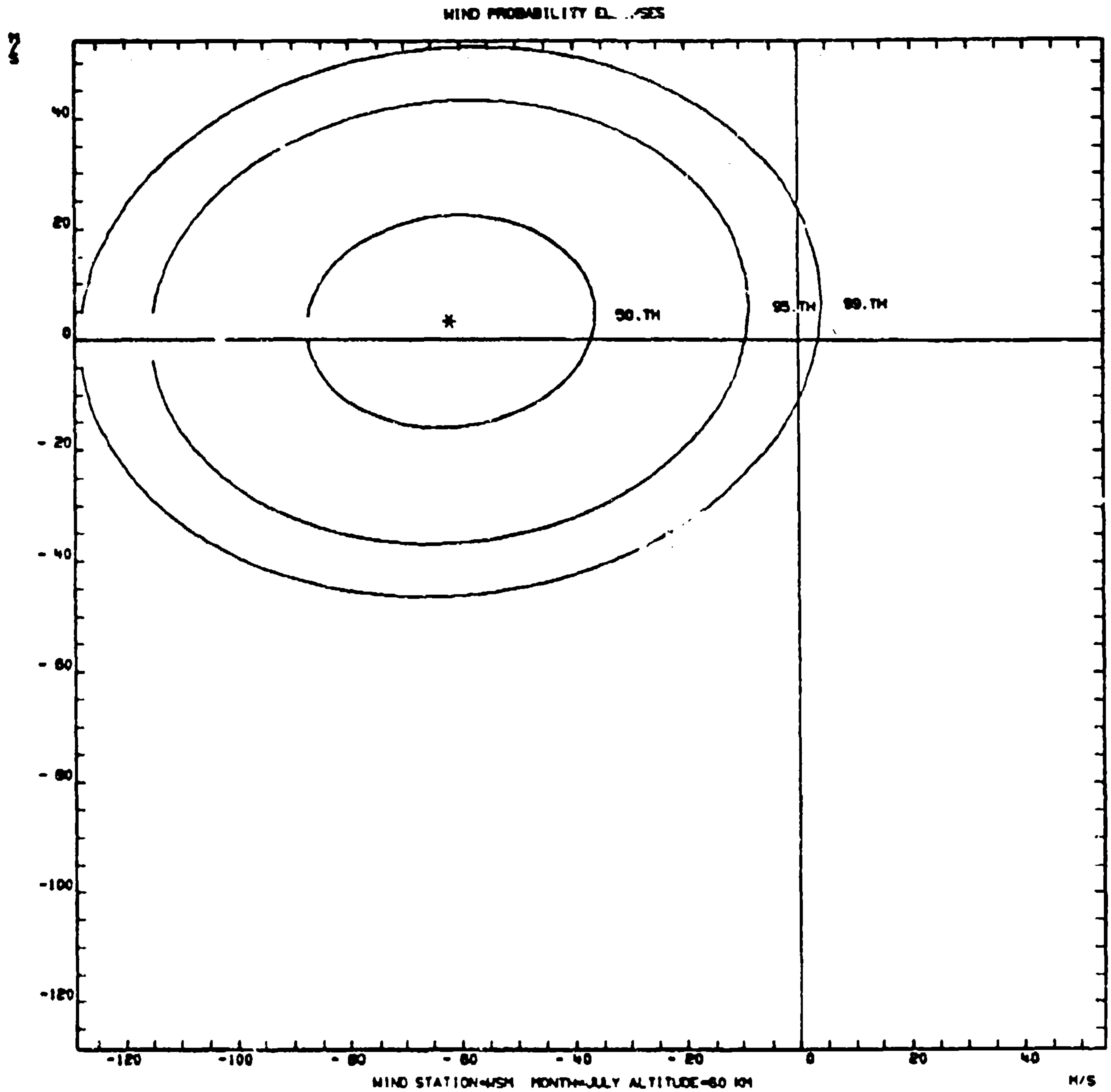

WIND PROBABILITY EL SES
M/S
80
0
-20
-40
-60
50.TH
95.TH 99.TH
-60
-40
-20
0
20
WIND STATION=WSR MONTH=JULY ALTITUDE=50 KM
M/S

Figure A-46.



WIND PROBABILITY EL..../SES
M/S
40
20
0
- 20
- 40
- 60
- 80
-100
-120
50.TH
95.TH
99.TH
-120
-100
- 80
- 60
- 40
- 20
0
20
40
WIND STATION=WSM MONTH=JULY ALTITUDE=60 KM
M/S

Figure A-47.

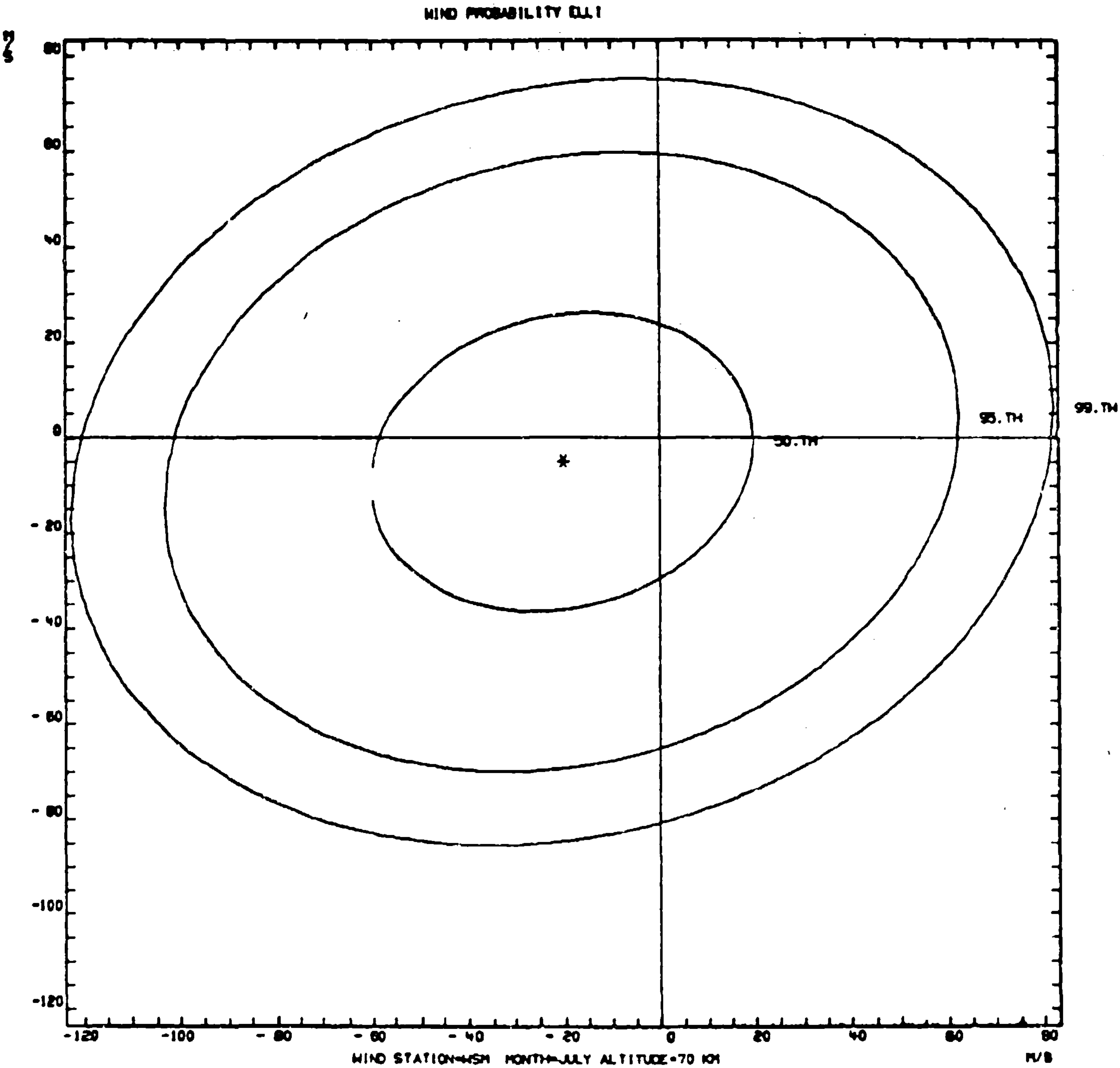

WIND PROBABILITY ELLI
M/S
80
60
40
20
0
-20
-40
-60
-80
-100
-120
50.TH
95.TH
99.TH
-120
-100
-80
-60
-40
-20
0
20
40
60
80
WIND STATION=WSM MONTH=JULY ALTITUDE=70 KM
M/S

Figure A-48.

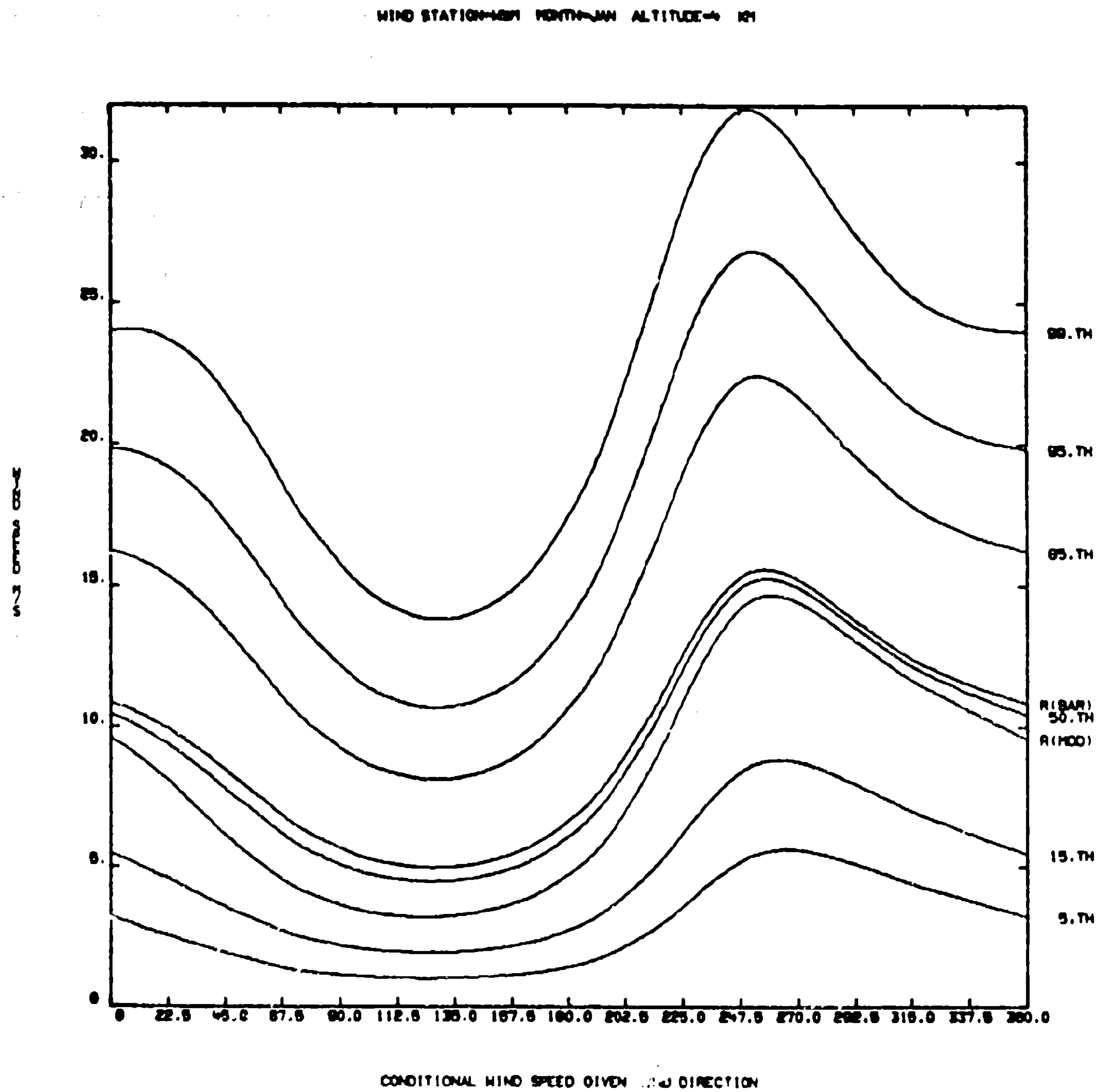

MONTH=JAN ALTITUDE=4 KM
30.
25.
20.
15.
10.
5.
0
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
CONDITIONAL WIND SPEED GIVEN
DIRECTION
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Figure A-49.

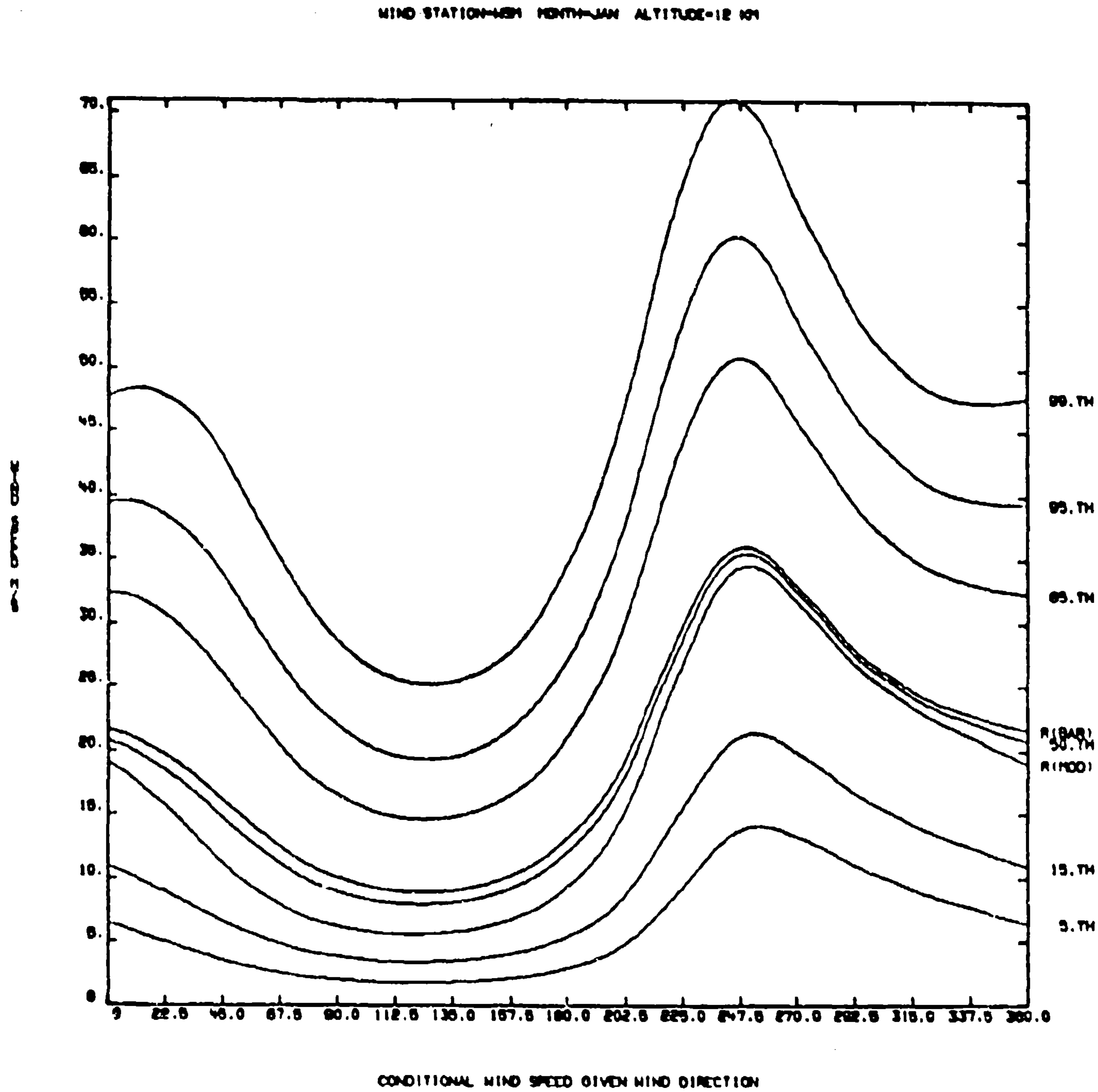
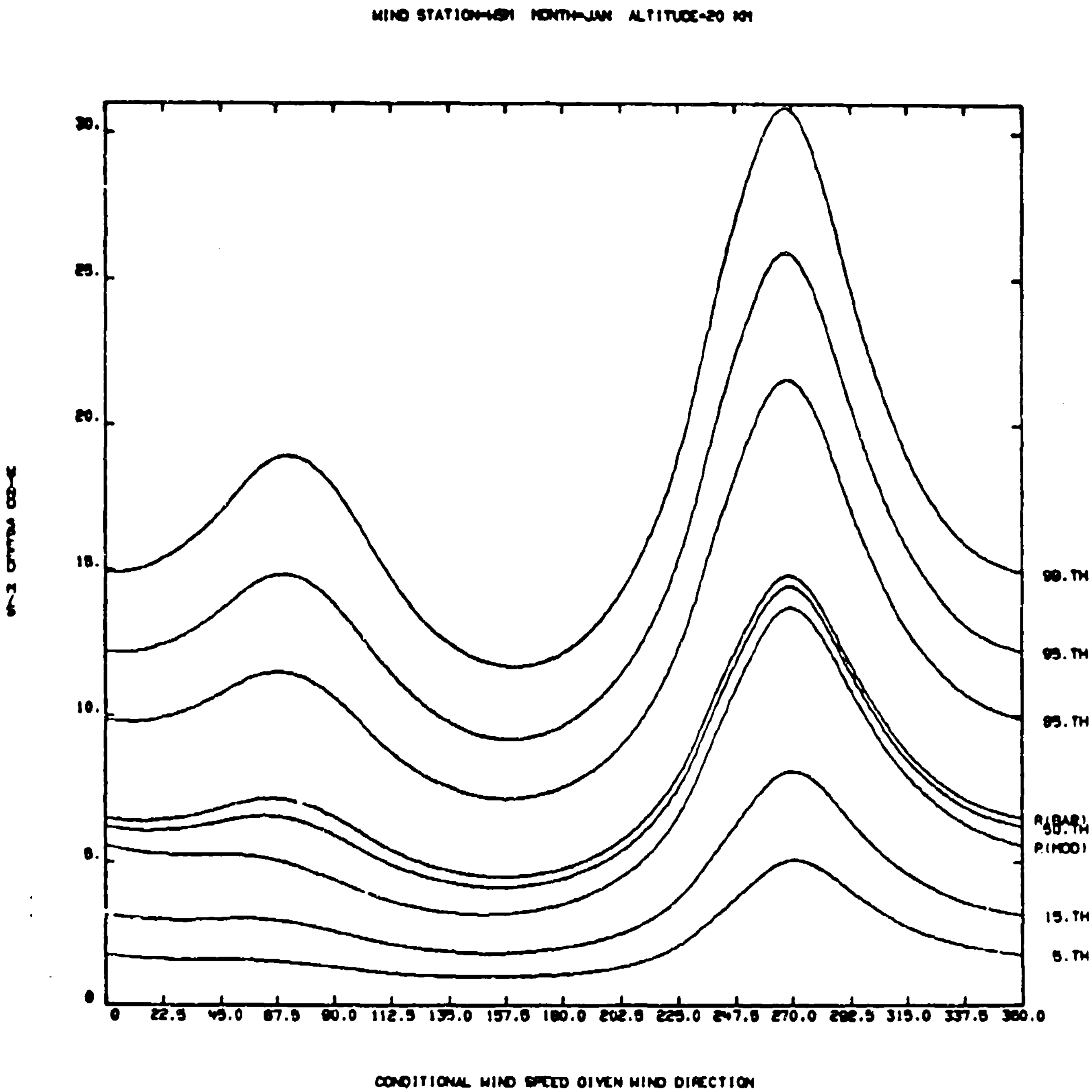

WIND STATION=WBM MONTH=JAN ALTITUDE=12 KM
70.
65.
60.
55.
50.
45.
40.
35.
30.
25.
20.
15.
10.
5.
0
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

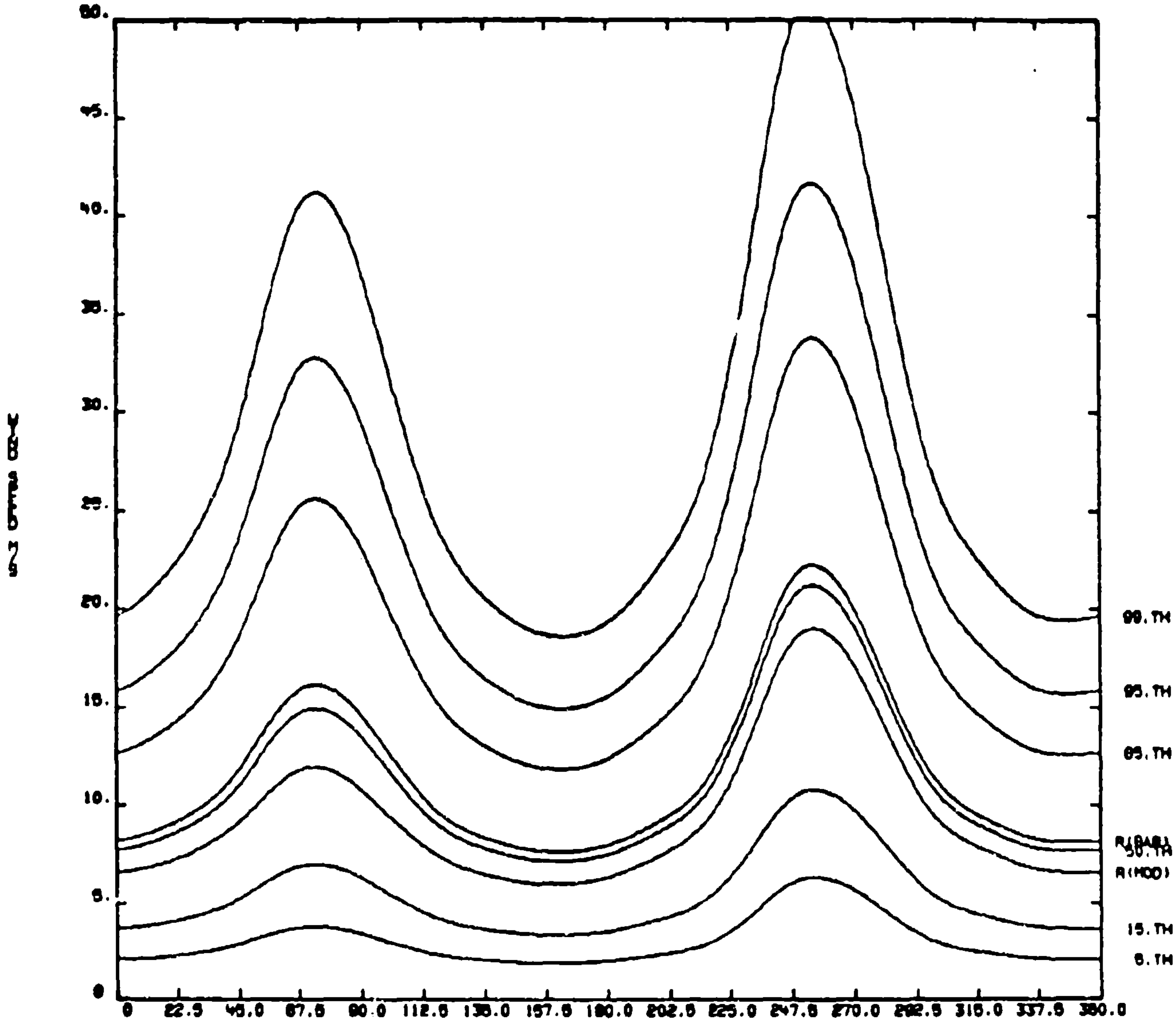
Figure A-50.



WIND STATION=WSM MONTH=JAN ALTITUDE=20 KM
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-51.

WIND STATION= MONTH=JAN ALTITUDE=30 KM



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-52.

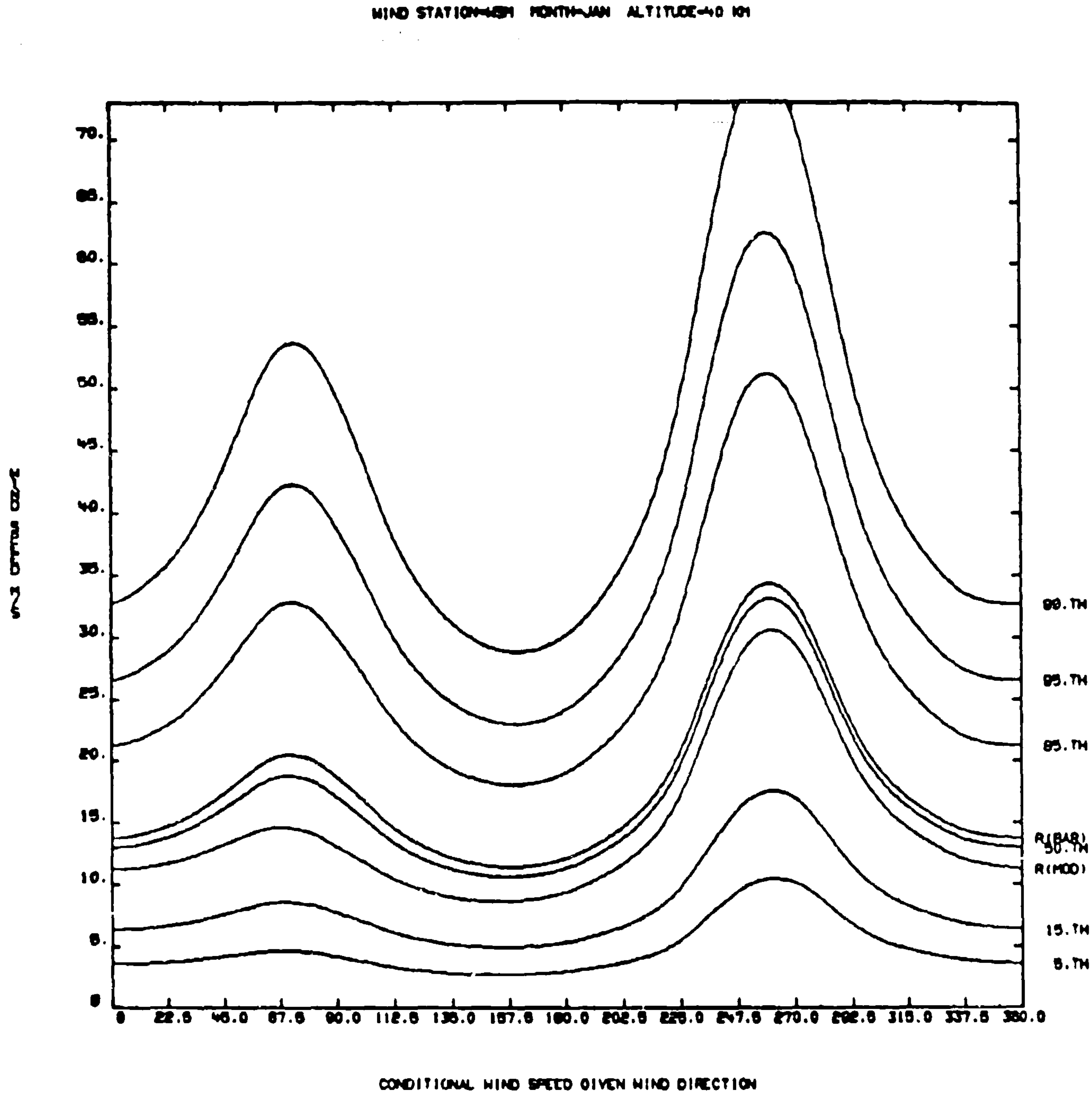

WIND STATION=WSM MONTH=JAN ALTITUDE=40 KM
70.
65.
60.
55.
50.
45.
40.
35.
30.
25.
20.
15.
10.
5.
0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-53.

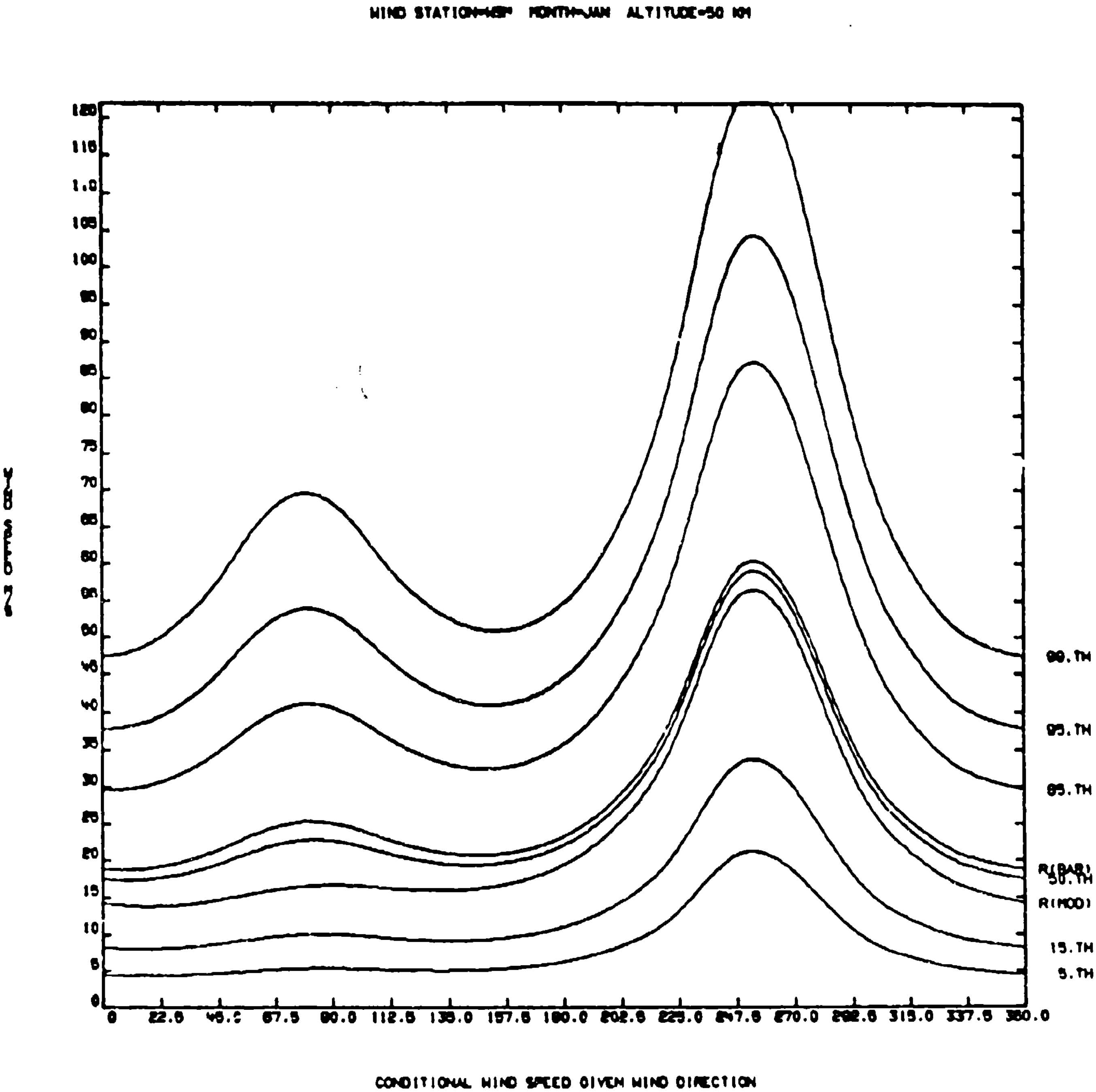

MONTH=JAN ALTITUDE=50 KM
WIND SPEED M/S
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-54.

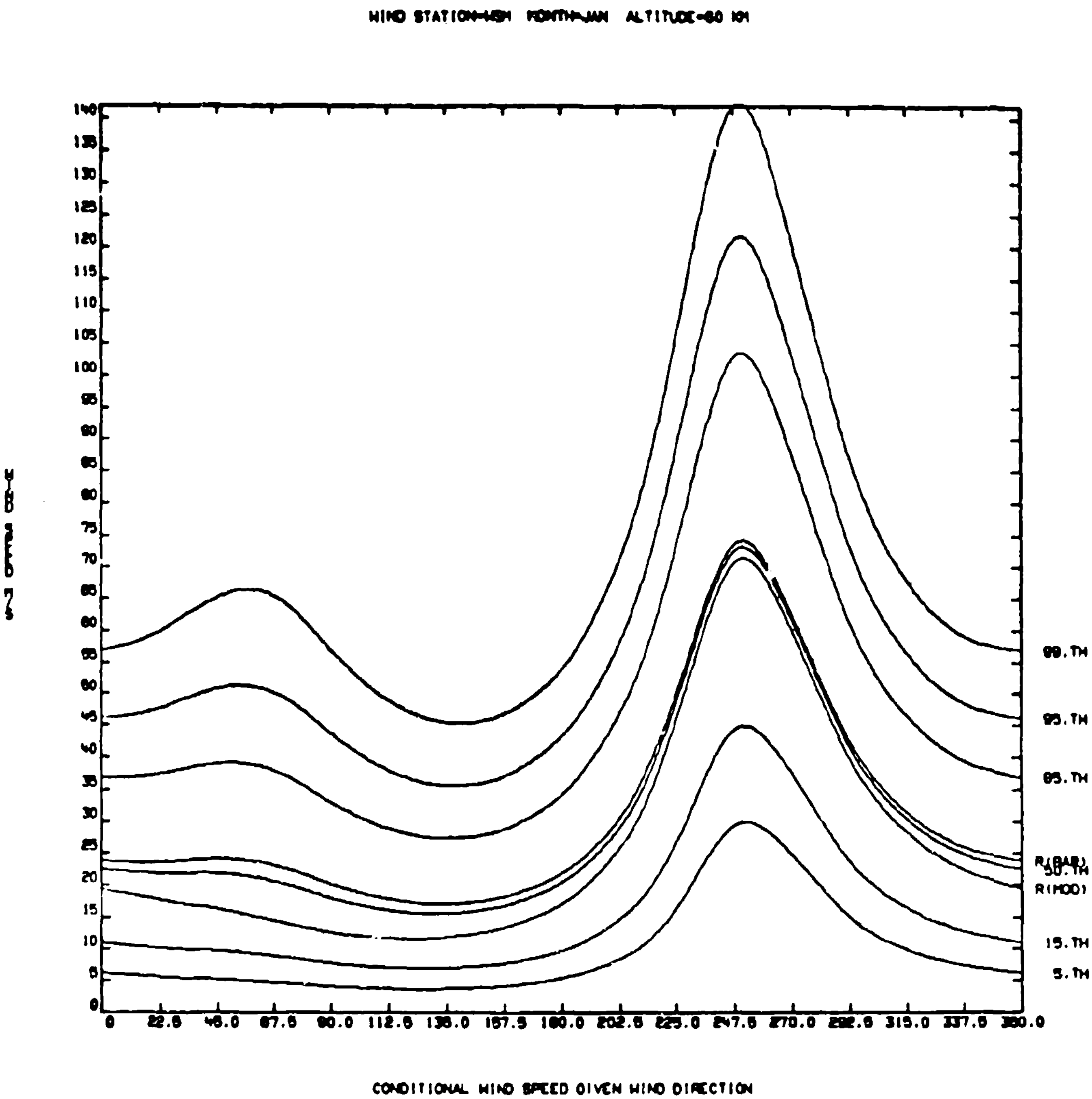

WIND STATION=WSM MONTH=JAN ALTITUDE=60 KM
WIND SPEED M/S
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-55.

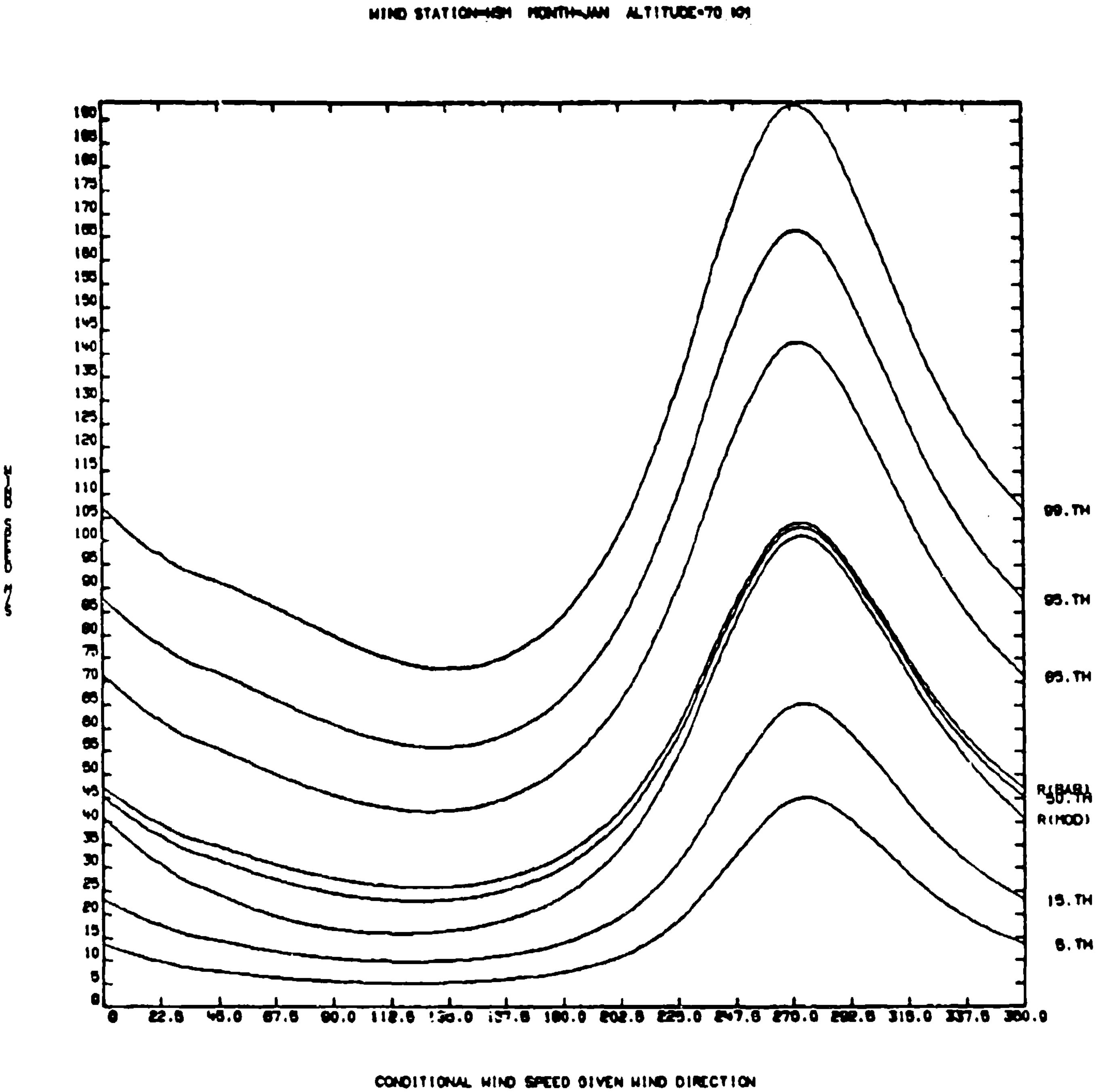

MONTH=JAN
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-56.

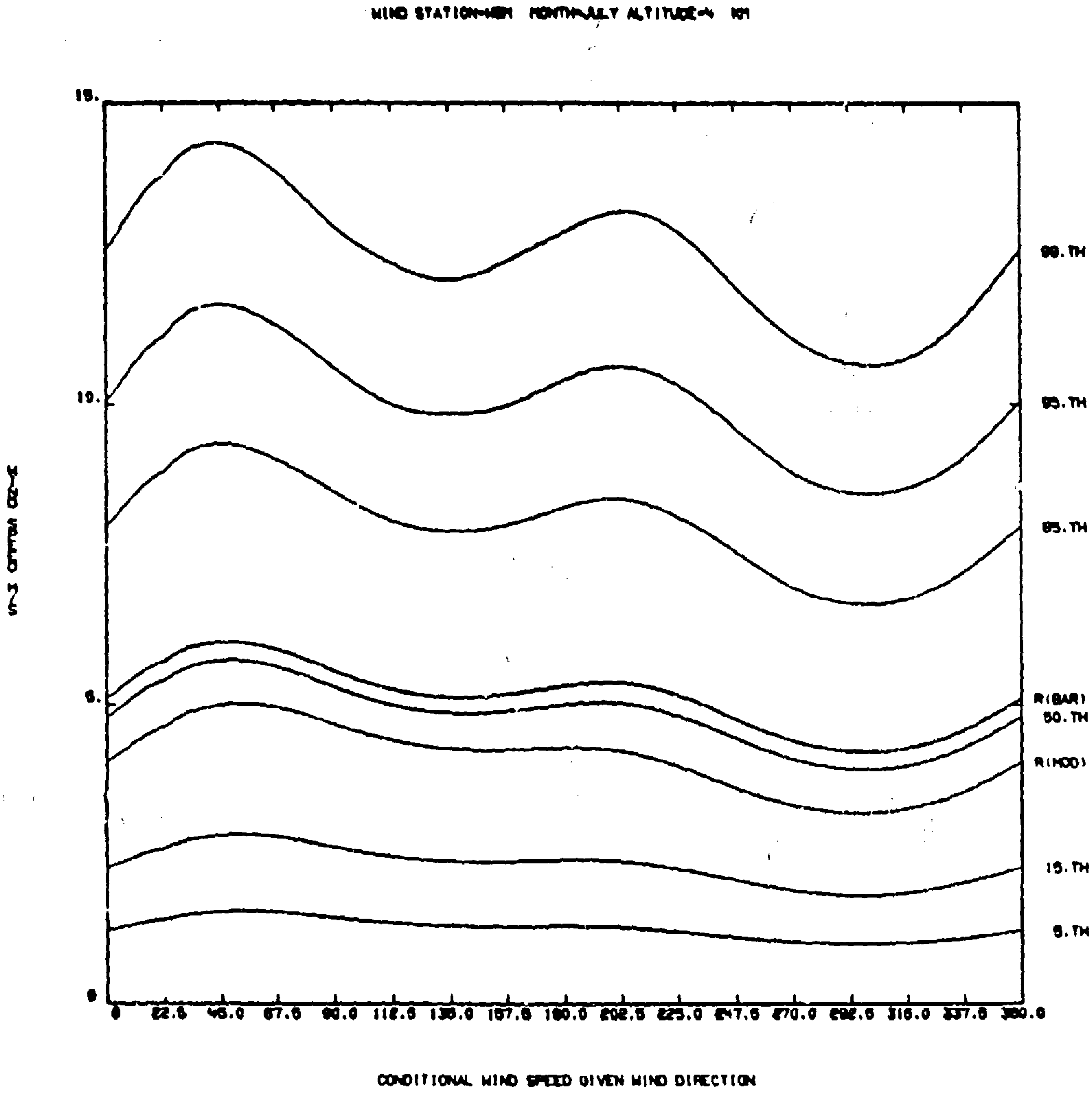

WIND STATION-WSM MONTH-JULY ALTITUDE-4 KM
15.
10.
5.
0
WIND SPEED M/S
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-57.

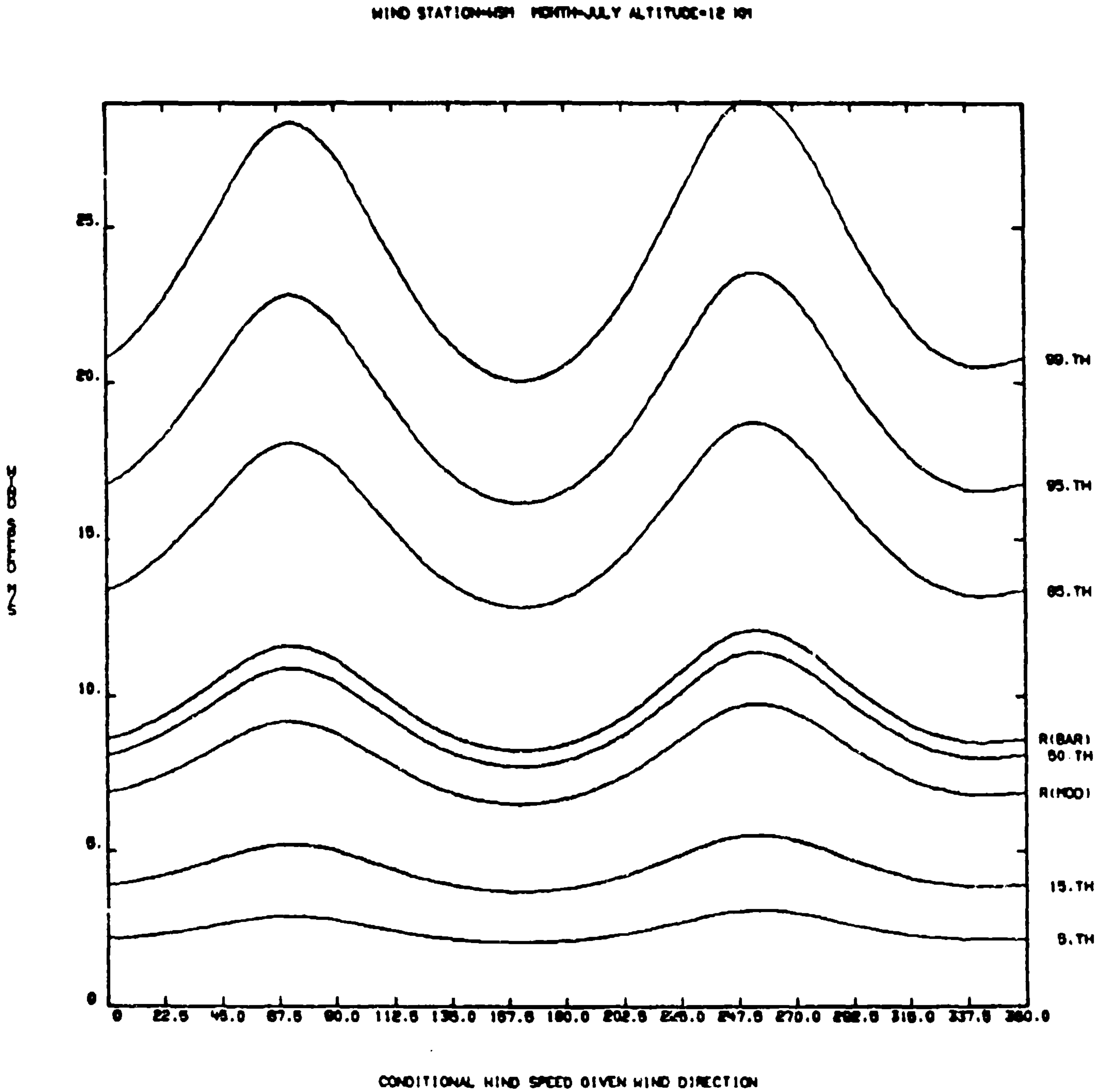

WIND STATION=WSM MONTH=JULY ALTITUDE=12 KM
WIND SPEED M/S
0
5.
10.
15.
20.
25.
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-58.

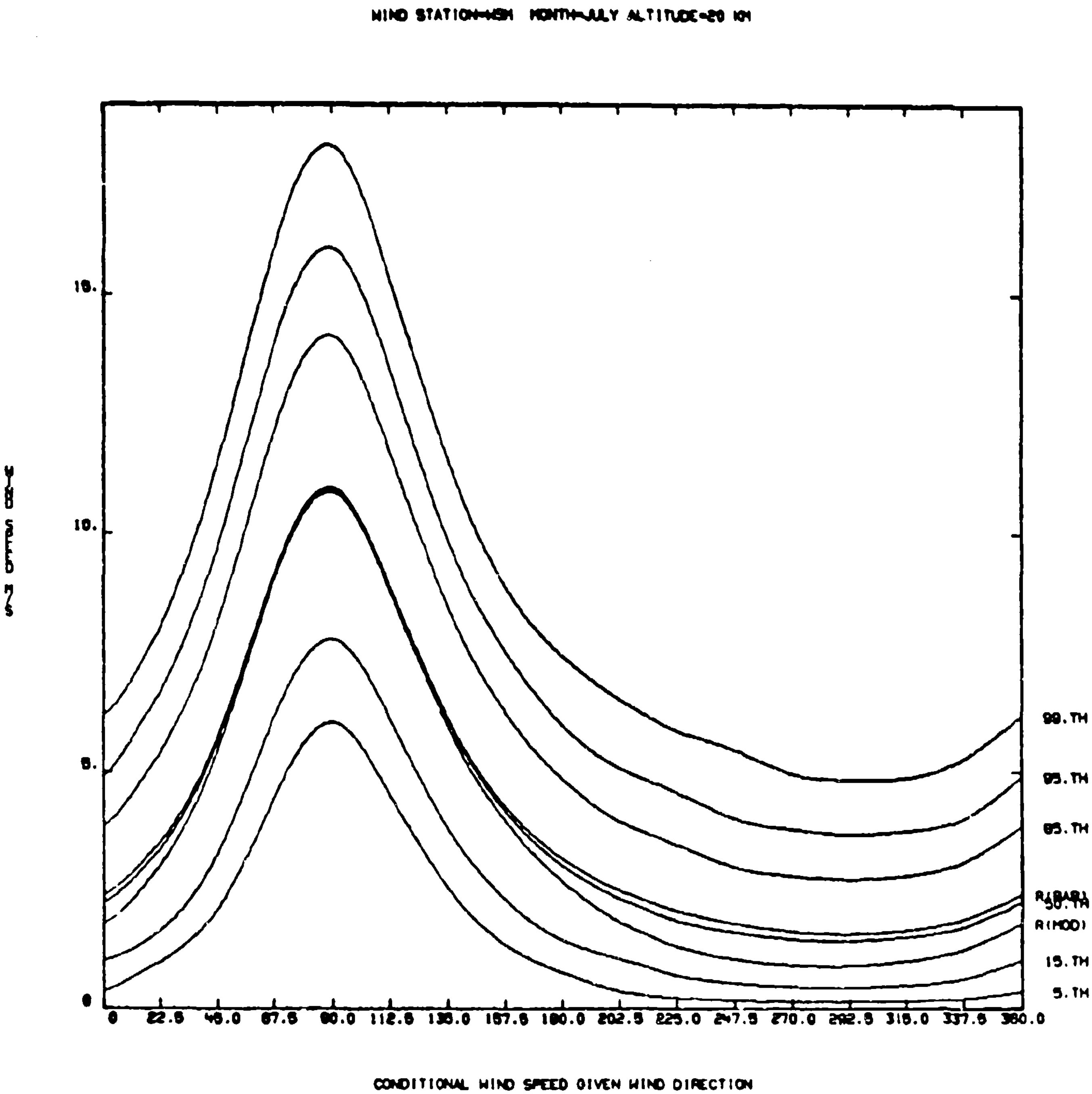

WIND STATION=WSM MONTH=JULY ALTITUDE=20 KM
WIND SPEED M/S
15.
10.
5.
0
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-59.

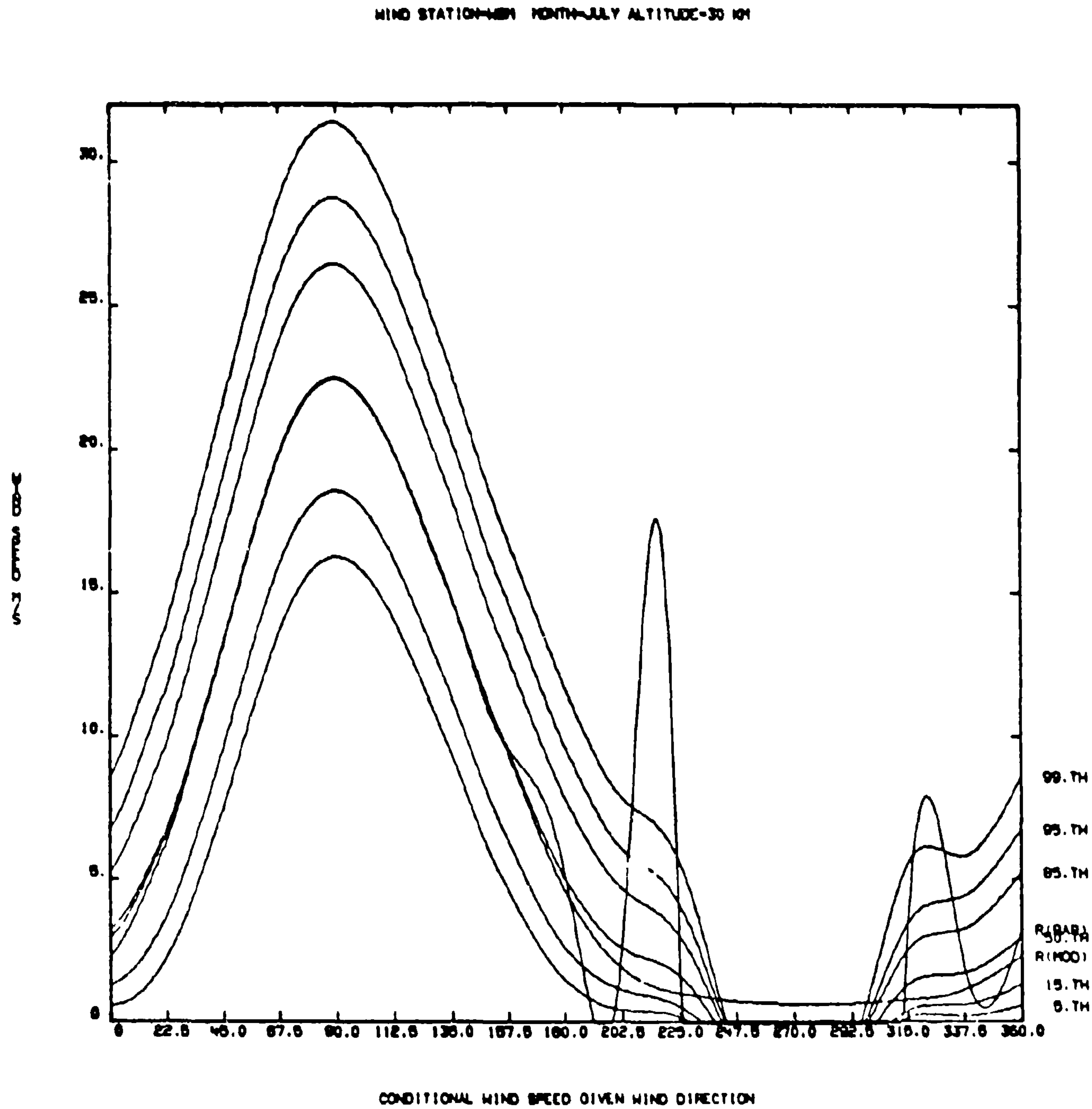
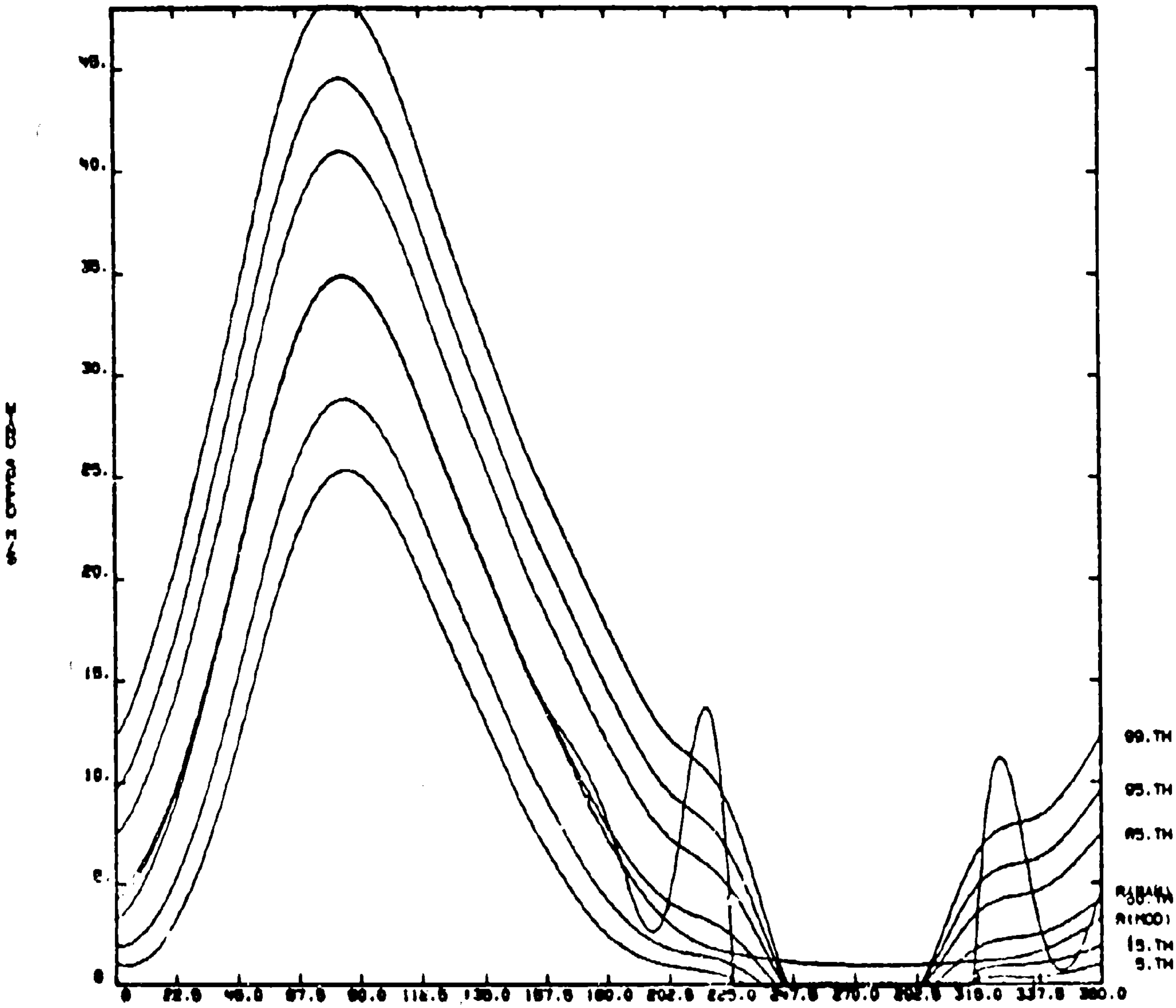

WIND STATION=WSM MONTH=JULY ALTITUDE=30 KM
30.
25.
20.
15.
10.
5.
0
WIND SPEED M/S
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-60.

WIND STATION=WSM MONTH=JULY ALTITUDE=40 KM



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-61.

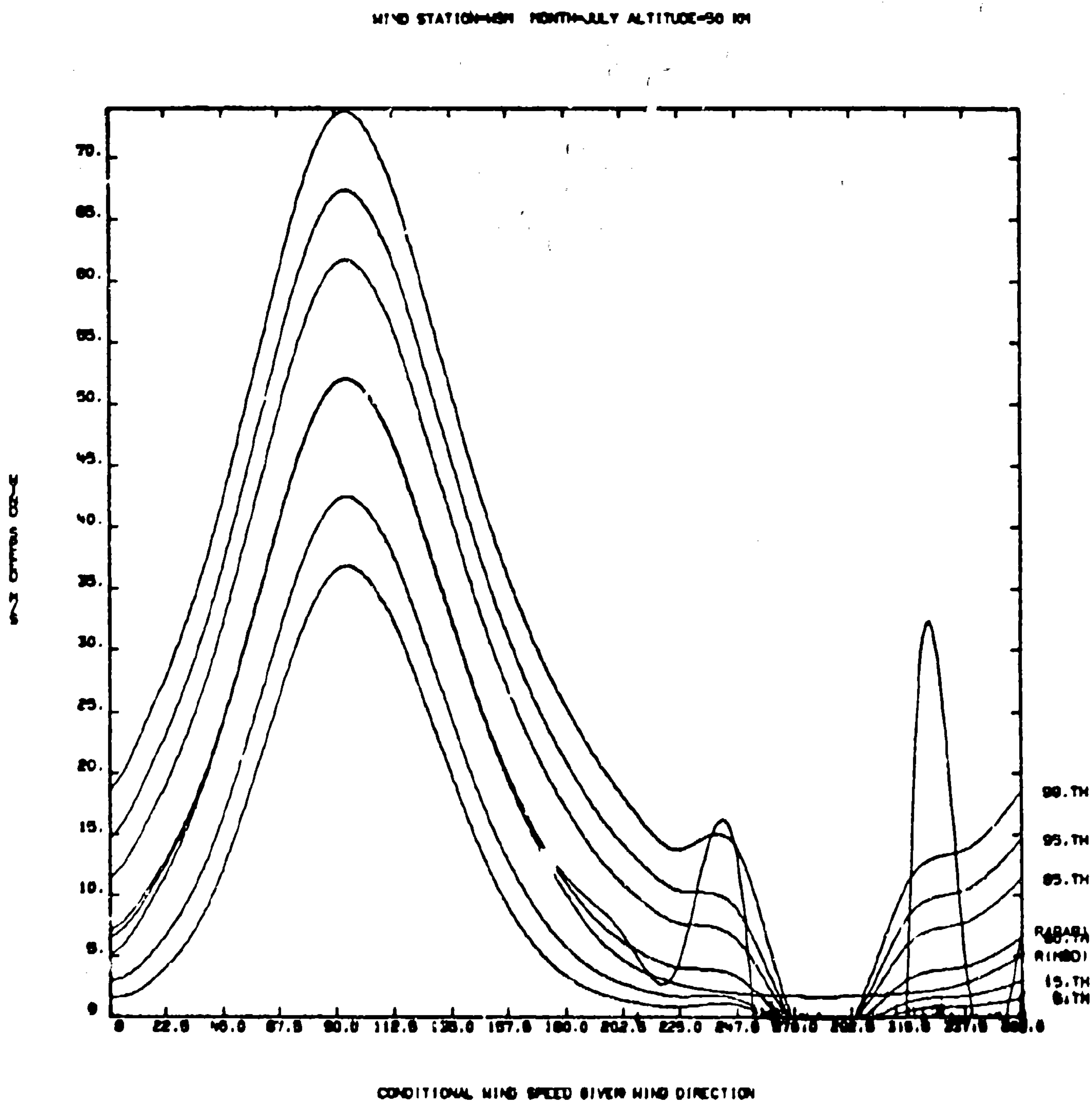

WIND STATION=WSM MONTH=JULY ALTITUDE=50 KM
70.
65.
60.
55.
50.
45.
40.
35.
30.
25.
20.
15.
10.
5.
0
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
RABAR
50.TH
RIMBO
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-62.

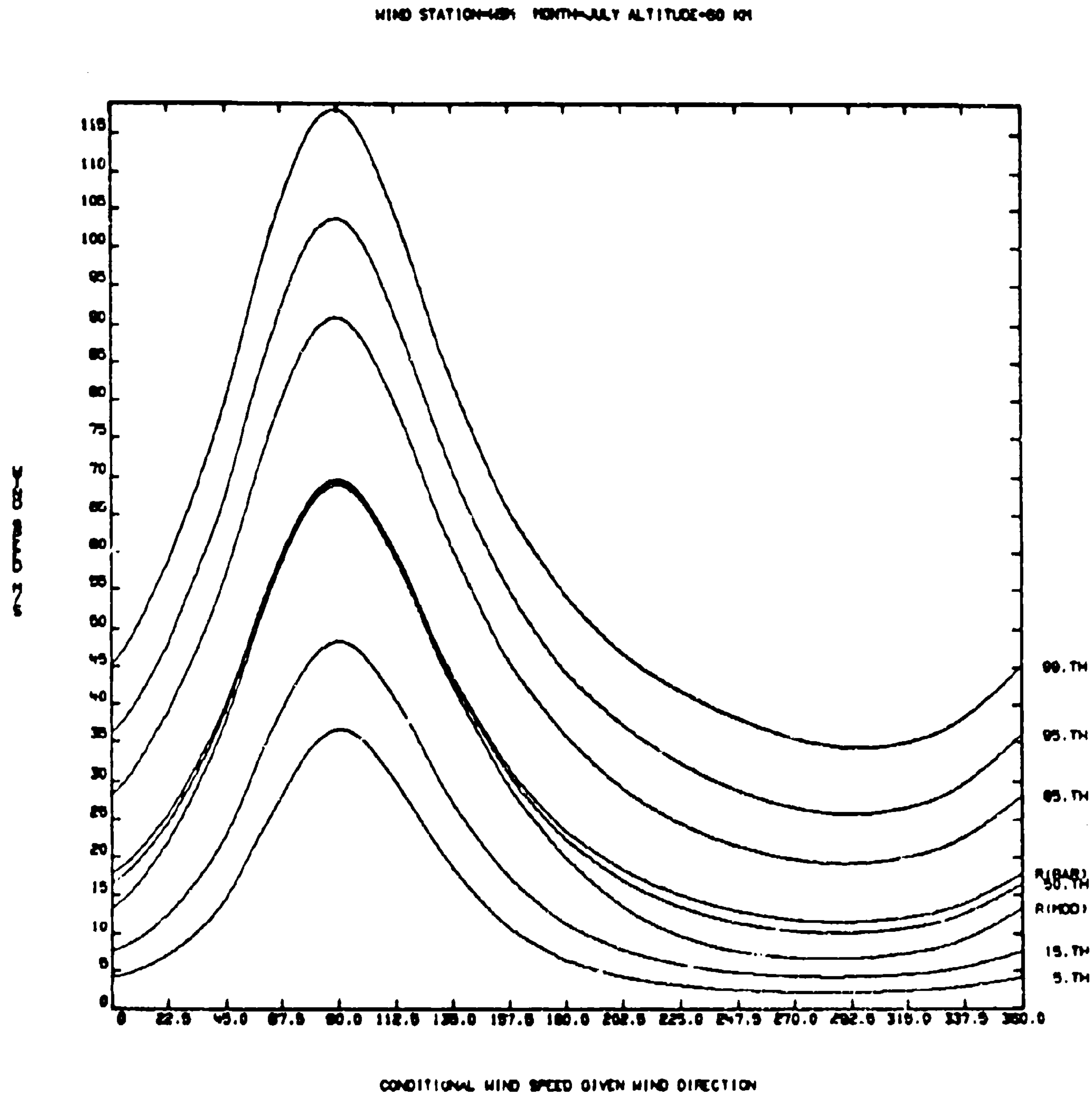
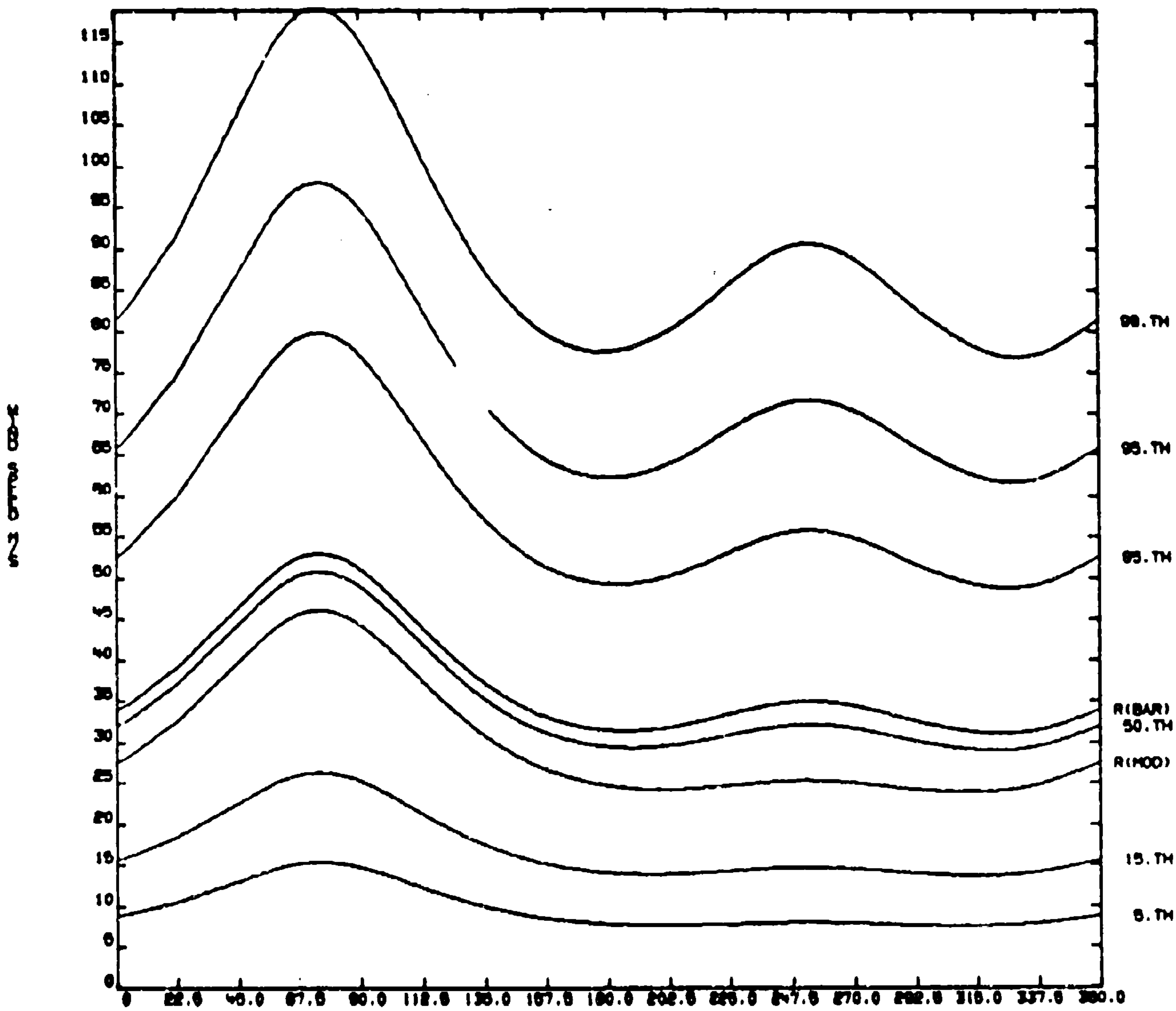

MONTH=JULY ALTITUDE=60 KM
WIND SPEED M/S
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-63.

WIND STATION=WSM MONTH=JULY ALTITUDE=70 KM



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

Figure A-68.

APPENDIX B

RANGE SPECIFIC INFORMATION AND THERMODYNAMIC QUANTITIES FOR WHITE SANDS MISSILE RANGE, NEW MEXICO

1. Range Specific Information

To prevent further character size reduction for tables I through IV certain range specific information has been omitted. This important information is given in table B-1.

TABLE B-1

	Header Record 0-30 Km	Header Record 32-70 Km
Table Number	0	0
Data Source (1 = DATSAV, 2 = WDC-A)	1	1
Call Letters	HMN	WSD
WMO Number	74732	72269
Latitude	32°53'	32°29'
Direction (N or S)	N	N
Longitude	106-°06'	106°25'
Direction (E or W)	W	W
Elevation in Meters	1258	1210
Start Period of Record (Mo-Yr)	169	160
End Period of Record (Mo-Yr)	1278	1271
No. of Time Windows (0, 1 or 3)	1	1
Start Time Window #1 (Hr-MNZ)	0	0
End Time Window #1	2359	2359
Start Time Window #2	0	0
End Time Window #2	0	0
Date of RRA	1280	1280
Altitude Range of RRA Low Level (km)	0	30
Altitude Range of RRA High Level (km)	30	70
Start Deviation of Thermodynamic Limits	6.0	6.0
Wind Limits	6.0	6.0

2. Thermodynamic Quantities

This section presents examples of further computations and graphical displays of pressure, density, and virtual temperature statistics that can be derived from the data given in tables II, III, and IV. No attempt is made to present complete nor exhaustive illustrations that can be made to aid in visualizing the relationships that can be made from the data in tables II and IV. The choices are those that aided the committee to verify the reasonableness of the tabulations.

2.1 Monthly Means from the Annual Mean

The hydrostatic model values in table IV are used to compute (1) the monthly mean differences relative to the annual mean values of pressure, density, and virtual temperature expressed in percent and (2) the monthly mean difference in virtual temperature for the annual mean virtual temperature expressed in degrees Kelvin. Examples of these four statistics are given in table B-2 for January and table B-3 for July. Graphical displays of the four statistics contained in tables B-2 and B-3 are shown in figures B-1 through B-8. Also, the relative differences between the monthly mean values from table IV-1 through IV-12 for all months from the annual mean values (table IV-13) are illustrated in figure B-9 for pressure, in figure B-10 for density, and in figure B-11 for virtual temperature. The monthly mean virtual temperature differences from the annual mean virtual temperature for all months are given in figure B-12. The simple sum of the monthly mean differences from the annual mean values of these quantities is not zero. This is because the annual mean statistical parameters are computed (see section C of text) by weighting the monthly means by the number of observations in each month.

2.2 Coefficients of Variation and Derived Correlation Coefficients

The coefficient of variation, C_V, is defined by the standard deviation with respect to the mean divided by the mean. The coefficients of variation for pressure, C_VP, and density, C_VD, were computed using the standard deviations from table II and the hydrostatic mean values from table IV. The coefficient of variation for temperature uses the standard deviations of virtual temperature from table III to the altitude where virtual temperature exists. Above this altitude, the standard deviations of temperature are from table II. The mean values for temperature (virtual temperature to the altitude where it exists) are taken from table IV. No distinction is made in the table headings in table B-4 (January) and table B-5 (July) and all related figures between virtual temperature and temperature.

From the coefficients of variation for pressure, density, and temperature (virtual temperature to the altitude where it exists), the correlation coefficients between these quantities are derived using Buell's method (see reference in text). The equations for these derived correlation coefficients are

$$r(P,T) = \frac{(C_VT)^2 + (C_VP)^2 - (C_VD)^2}{2[C_VT \cdot C_VP]} \quad , \qquad (B-1)$$

$$r(P,D) = \frac{(C_VD)^2 - (C_VT)^2 + (C_VP)^2}{2[C_VD \cdot C_VP]} \quad , \qquad (B-2)$$

$$r(T,D) = \frac{(C_VP)^2 - (C_VD)^2 - (C_VT)^2}{2[C_VT \cdot C_VD]} \quad , \qquad (B-3)$$

The correlation coefficients in tables B-4 and B-5 are derived from the above equations.

A test for the validity of the derived correlation coefficients is that all three of the following inequalities be satisfied.

$$
\begin{aligned}
C_VP - [C_VD + C_VT] &< 0 \\
C_VD - [C_VT + C_VP] &< 0 \\
C_VT - [C_VP + C_VD] &< 0
\end{aligned}
\tag{B-4}
$$

In these examples (tables B-4 and B-5) the numerical values from equation (B-4) are all negative; hence, the derived correlation test is considered valid. The rare exceptions to this test for several RRAs occur at the extreme highest altitudes, where samples sizes for the statistical sample are small.

The statistical parameters from table B-4 (January) and table B-5 (July) are illustrated in figures B-13 through B-16.

For all months the C_VP values are shown in figure B-17, the C_VD values are shown in figure B-18, and C_VT values are shown in figure B-19. If the abscissa on the figures for the coefficient of variation were multiplied by 100, these figures would show the percentage of the random dispersion of these quantities over the month with respect to the monthly mean for these thermodynamic quantities.

The derived correlation coefficients for all months are illustrated in the following figures:

a) Figure B-20 gives r(P,D).

b) Figure B-21 gives r(P,T).

c) Figure B-22 gives r(T,D).

TABLE B-2.

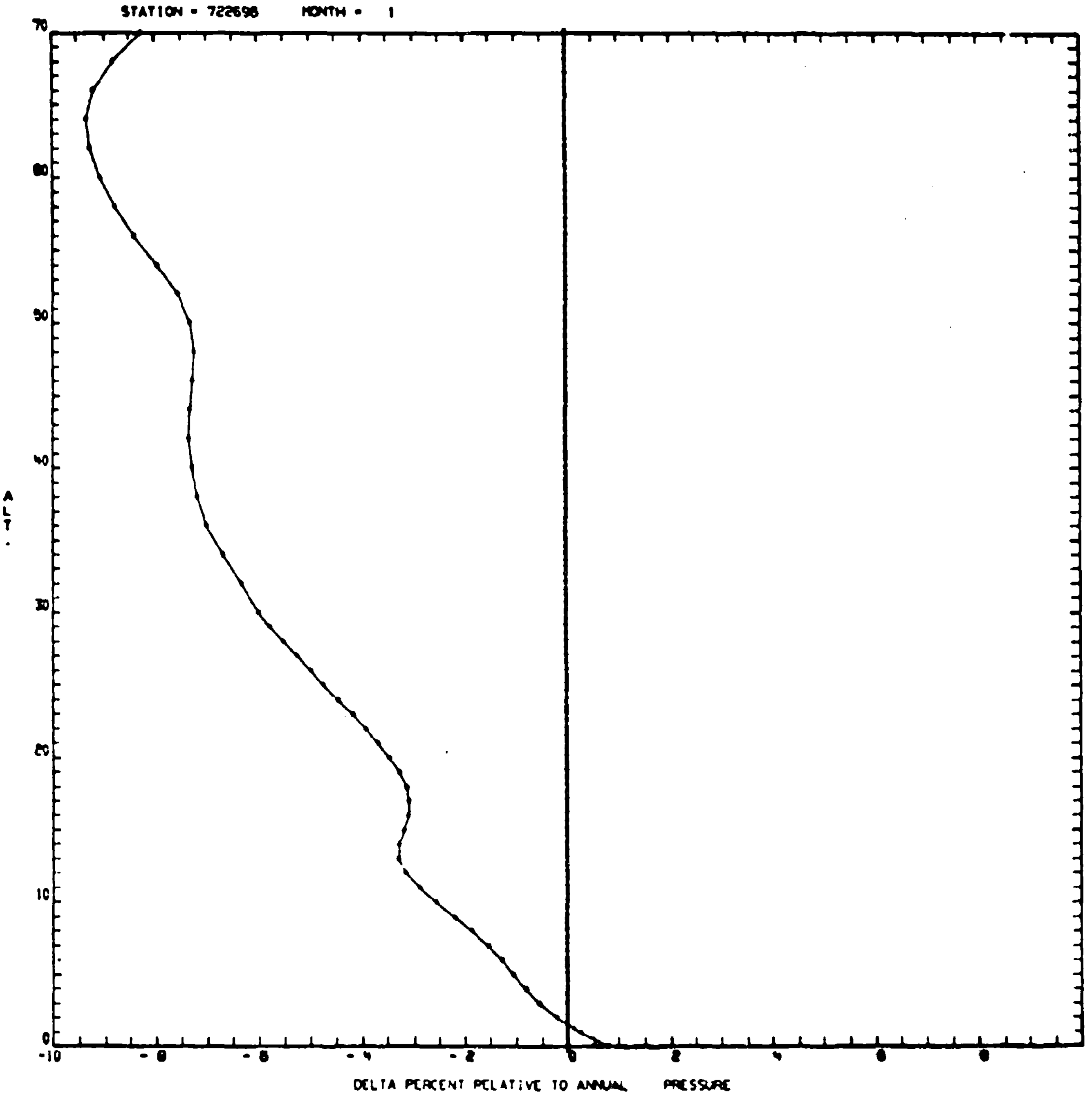
STATION 722698 MONTH 1
DELTAS IN PERCENT RELATIVE TO ANNUAL

LEVEL	PRESSURE	DENSITY	TEMP.	THO-TANN(DEG.K)
.000	.78	5.75	-4.81	-14.21
1.000	.24	4.43	-4.03	-11.68
1.246	.12	4.28	-3.90	-11.27
2.000	-.20	2.91	-2.99	-8.56
3.000	-.53	1.91	-2.41	-6.73
4.000	-.81	1.13	-1.93	-5.27
5.000	-1.04	.76	-1.78	-4.74
6.000	-1.20	.60	-1.87	-4.85
7.000	-1.55	.60	-2.13	-5.36
8.000	-1.85	.47	-2.32	-5.69
9.000	-2.19	.28	-2.47	-5.88
10.000	-2.56	-.09	-2.47	-5.69
11.000	-2.83	-.83	-2.06	-4.62
12.000	-3.15	-1.83	-1.38	-3.01
13.000	-3.28	-3.01	-.27	-.57
14.000	-3.26	-3.73	.45	.95
15.000	-3.18	-3.81	.66	1.30
16.000	-3.10	-3.40	.30	.62
17.000	-3.08	-3.04	-.03	-.07
18.000	-3.13	-2.60	-.54	-1.12
19.000	-3.25	-2.27	-1.00	-2.10
20.000	-3.44	-2.10	-1.36	-2.88
21.000	-3.66	-2.10	-1.59	-3.41
22.000	-3.91	-2.32	-1.63	-3.51
23.000	-4.17	-2.47	-1.74	-3.79
24.000	-4.44	-2.63	-1.86	-4.08
25.000	-4.72	-2.99	-1.78	-3.94
26.000	-4.97	-3.25	-1.78	-3.96
27.000	-5.24	-3.48	-1.80	-4.03
28.000	-5.50	-3.79	-1.78	-4.02
29.000	-5.77	-3.88	-1.98	-4.45
30.000	-5.90	-2.93	-.94	-2.15
32.000	-6.30	-3.11	-1.39	-3.24
34.000	-6.68	-3.48	-1.39	-3.30
36.000	-6.98	-4.30	-.88	-2.14
38.000	-7.17	-4.78	-.58	-1.43
40.000	-7.28	-5.12	-.33	-.84
42.000	-7.34	-5.38	-.12	-.32
44.000	-7.33	-5.71	.21	.56
46.000	-7.27	-5.70	.25	.70
48.000	-7.24	-5.35	-.04	-.10
50.000	-7.32	-4.91	-.64	-1.72
52.000	-7.59	-4.31	-1.50	-3.97
54.000	-7.96	-4.46	-1.75	-4.60
56.000	-8.39	-4.85	-1.81	-4.70
58.000	-8.73	-5.55	-1.50	-3.86
60.000	-9.09	-6.38	-.97	-2.46
62.000	-9.27	-6.97	-.53	-1.30
64.000	-9.34	-7.57	.02	.05
66.000	-9.22	-8.30	.95	2.29
68.000	-8.82	-8.99	2.25	5.30
70.000	-8.24	-8.51	2.29	5.23

TABLE B-3.

STATION 722698 MONTH 7
DELTAS IN PERCENT RELATIVE TO ANNUAL

LEVEL	PRESSURE	DENSITY	TEMP.	TMO-TANN(DEG.K)
.000	-.44	-5.00	4.58	13.47
1.000	.05	-3.97	4.09	11.87
1.246	.18	-3.69	3.98	11.50
2.000	.47	-2.77	3.34	9.57
3.000	.86	-2.26	3.19	8.91
4.000	1.23	-1.65	2.92	7.97
5.000	1.58	-1.18	2.77	7.37
6.000	1.95	-.98	2.94	7.61
7.000	2.36	-.94	3.34	8.41
8.000	2.84	-.78	3.63	8.90
9.000	3.36	-.40	3.77	8.95
10.000	3.89	.21	3.68	8.48
11.000	4.41	1.29	3.10	6.95
12.000	4.82	2.59	2.14	4.68
13.000	5.04	4.45	.55	1.17
14.000	5.03	6.08	-1.03	-2.17
15.000	4.75	6.72	-1.83	-3.83
16.000	4.43	6.37	-1.82	-3.76
17.000	4.17	5.56	-1.29	-2.66
18.000	4.03	4.38	-.34	-.70
19.000	4.02	3.72	.25	.53
20.000	4.09	3.48	.59	1.25
21.000	4.22	3.24	.95	2.03
22.000	4.38	3.27	1.07	2.32
23.000	4.56	3.37	1.16	2.52
24.000	4.74	3.59	1.11	2.43
25.000	4.92	3.78	1.11	2.45
26.000	5.10	3.88	1.16	2.58
27.000	5.29	4.08	1.18	2.65
28.000	5.47	4.18	1.25	2.82
29.000	5.67	4.43	1.21	2.76
30.000	5.80	4.39	1.50	3.44
32.000	6.30	4.96	1.26	2.93
34.000	6.62	5.67	.90	2.14
36.000	6.86	6.13	.69	1.58
38.000	7.06	6.37	.66	1.63
40.000	7.24	6.57	.64	1.63
42.000	7.37	7.07	.29	.75
44.000	7.43	7.30	.09	.25
46.000	7.45	7.33	.09	.24
48.000	7.49	7.30	.16	.44
50.000	7.50	7.60	-.07	-.20
52.000	7.45	7.78	-.27	-.71
54.000	7.35	7.87	-.48	-1.21
56.000	7.21	7.93	-.55	-1.43
58.000	6.90	8.17	-1.09	-2.79
60.000	6.59	8.44	-1.67	-4.27
62.000	6.02	8.52	-2.31	-5.75
64.000	5.31	8.04	-2.49	-6.10
66.000	4.51	7.76	-2.96	-7.12
68.000	3.82	5.64	-1.64	-3.88
70.000	3.35	4.87	-1.43	-3.28


STATION = 722698 MONTH = 1
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60
50
40
30
20
10
0
ALT.
-10
-8
-6
-4
-2
0
2
4
6
8
DELTA PERCENT RELATIVE TO ANNUAL PRESSURE

Figure B-1.

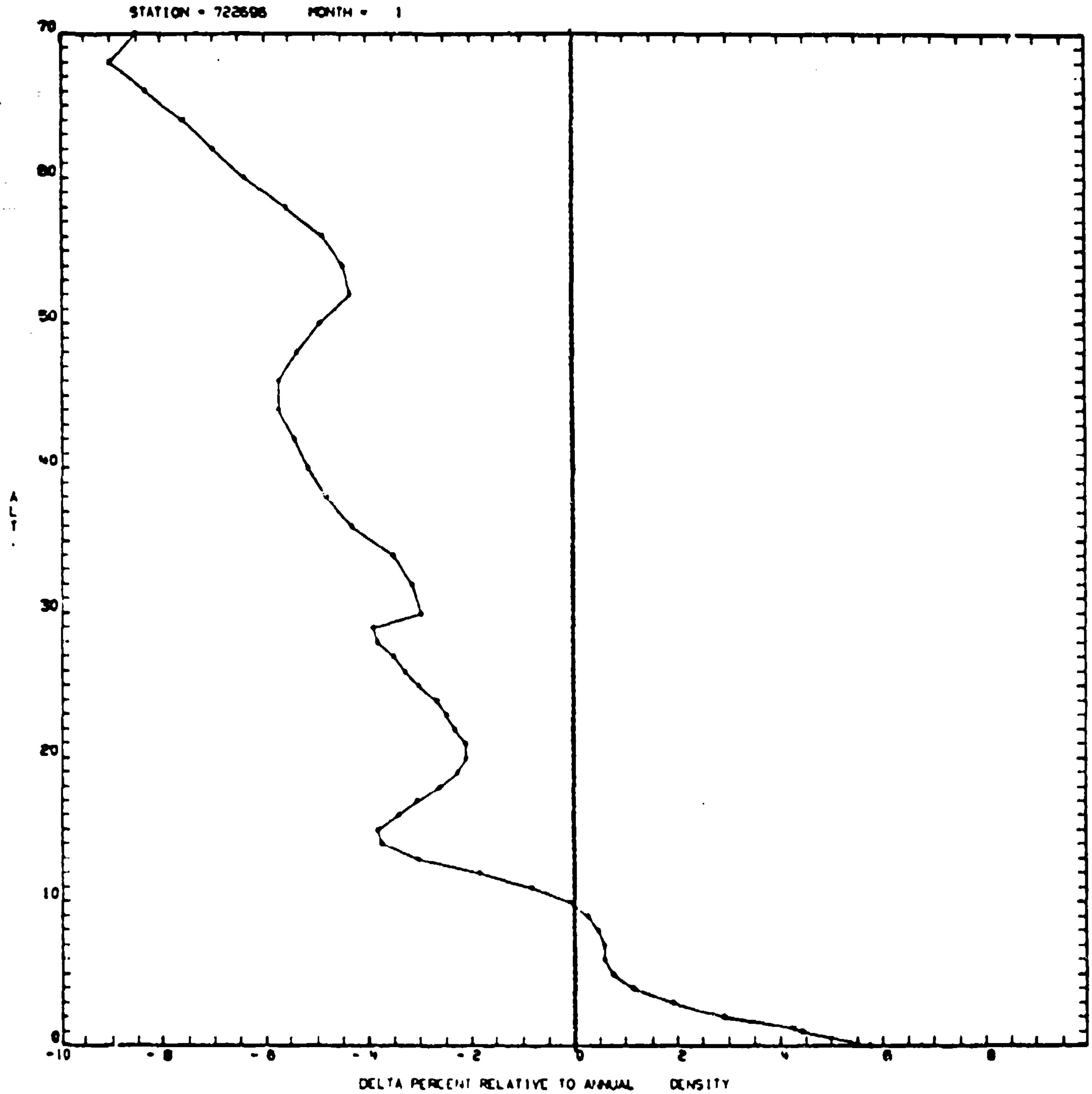
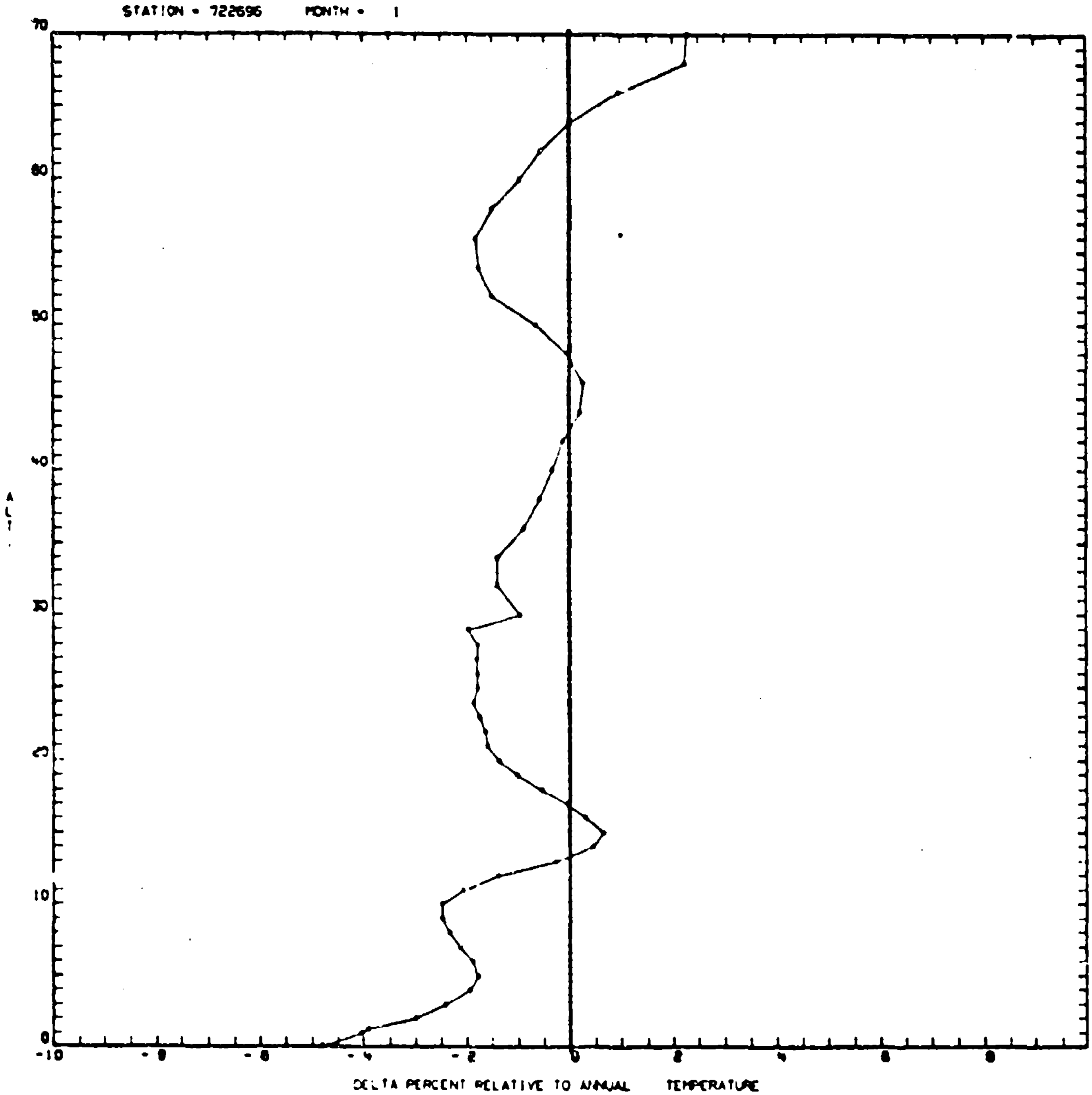

STATION = 722698 MONTH = 1
ALT
DELTA PERCENT RELATIVE TO ANNUAL DENSITY

Figure B-2.



STATION = 722696 MONTH = 1
ALT
DELTA PERCENT RELATIVE TO ANNUAL TEMPERATURE

Figure B-3.

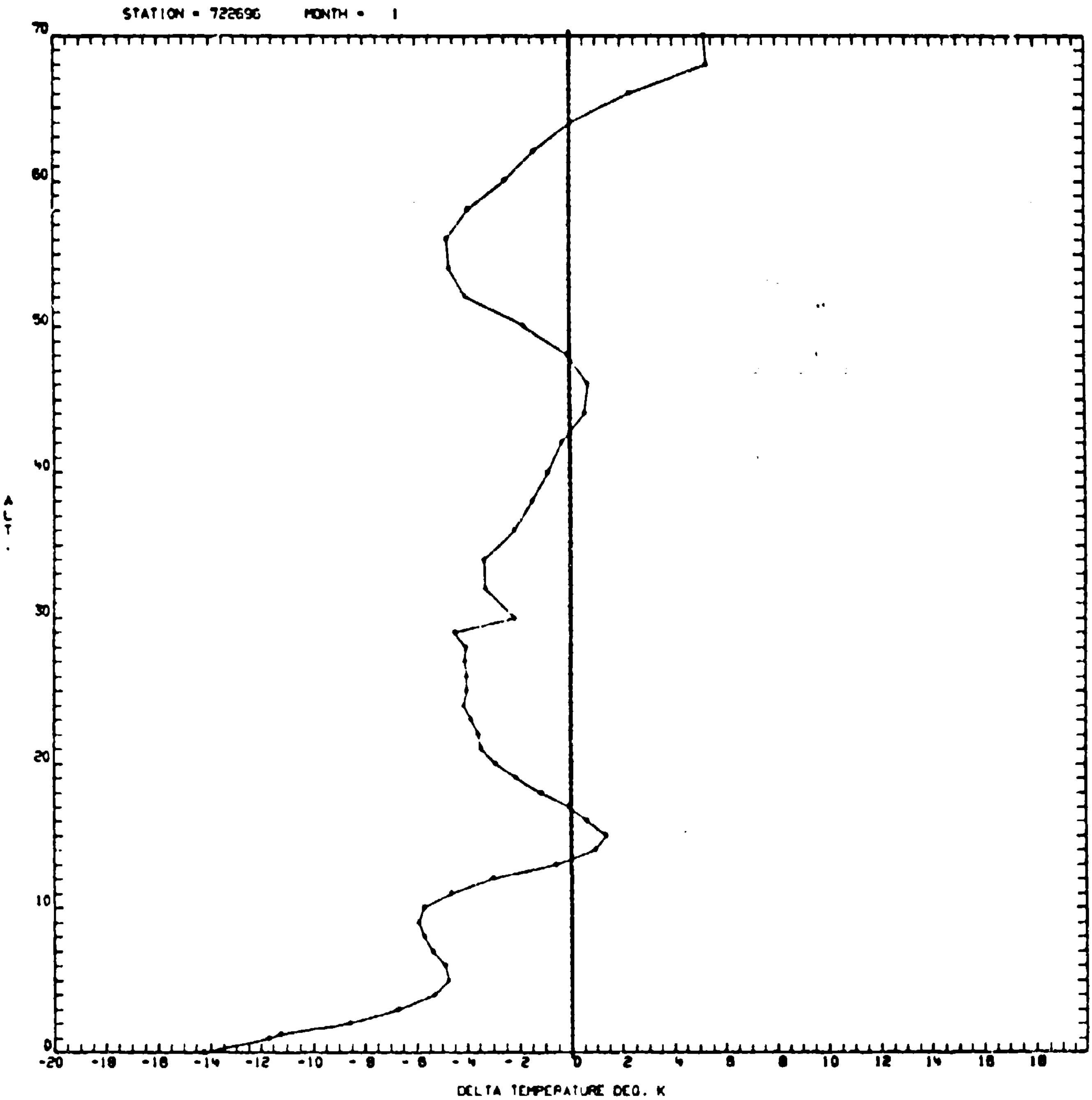
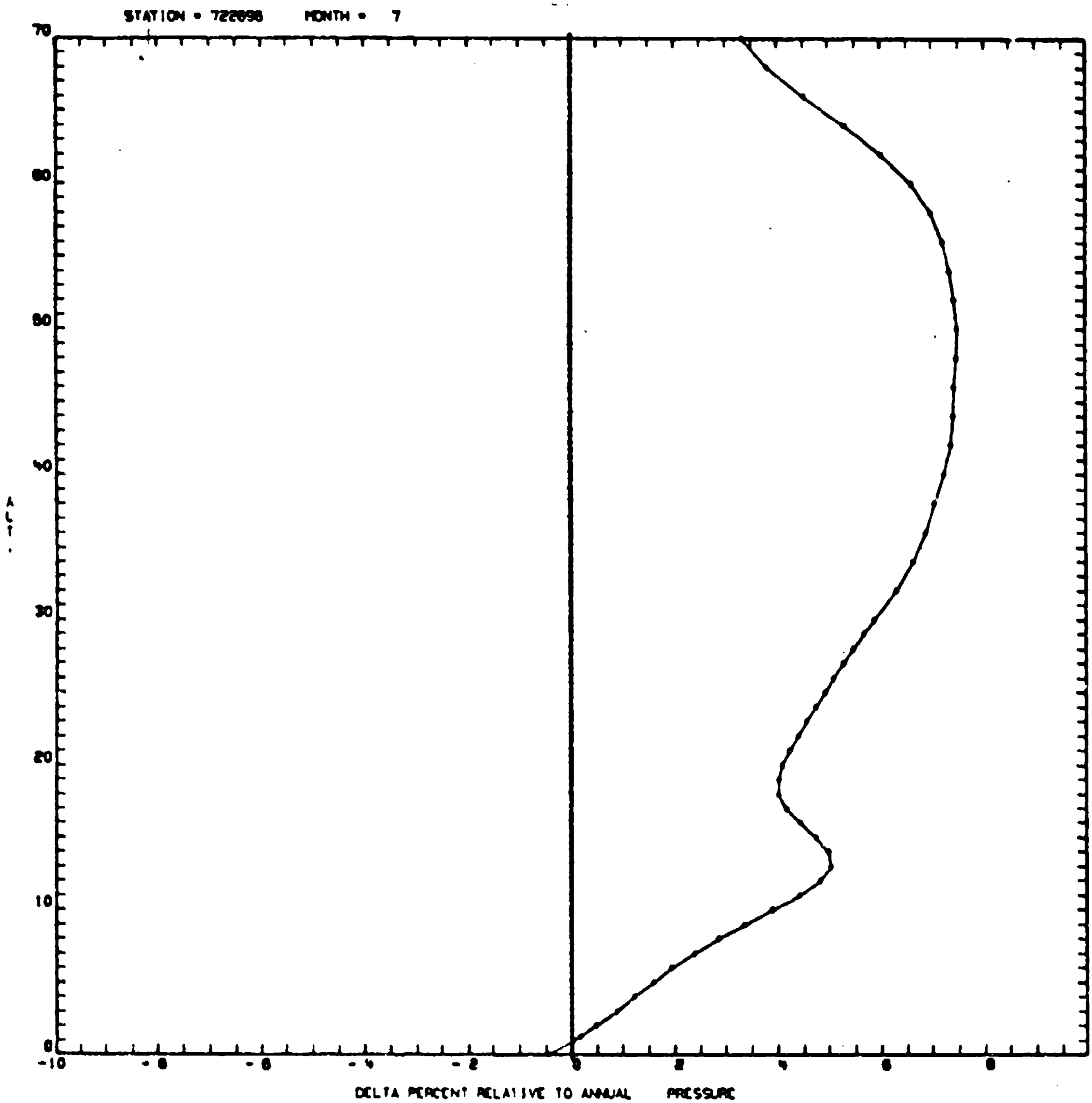


Figure B-4.



STATION = 722698 MONTH = 7
ALT
DELTA PERCENT RELATIVE TO ANNUAL PRESSURE

Figure B-5.

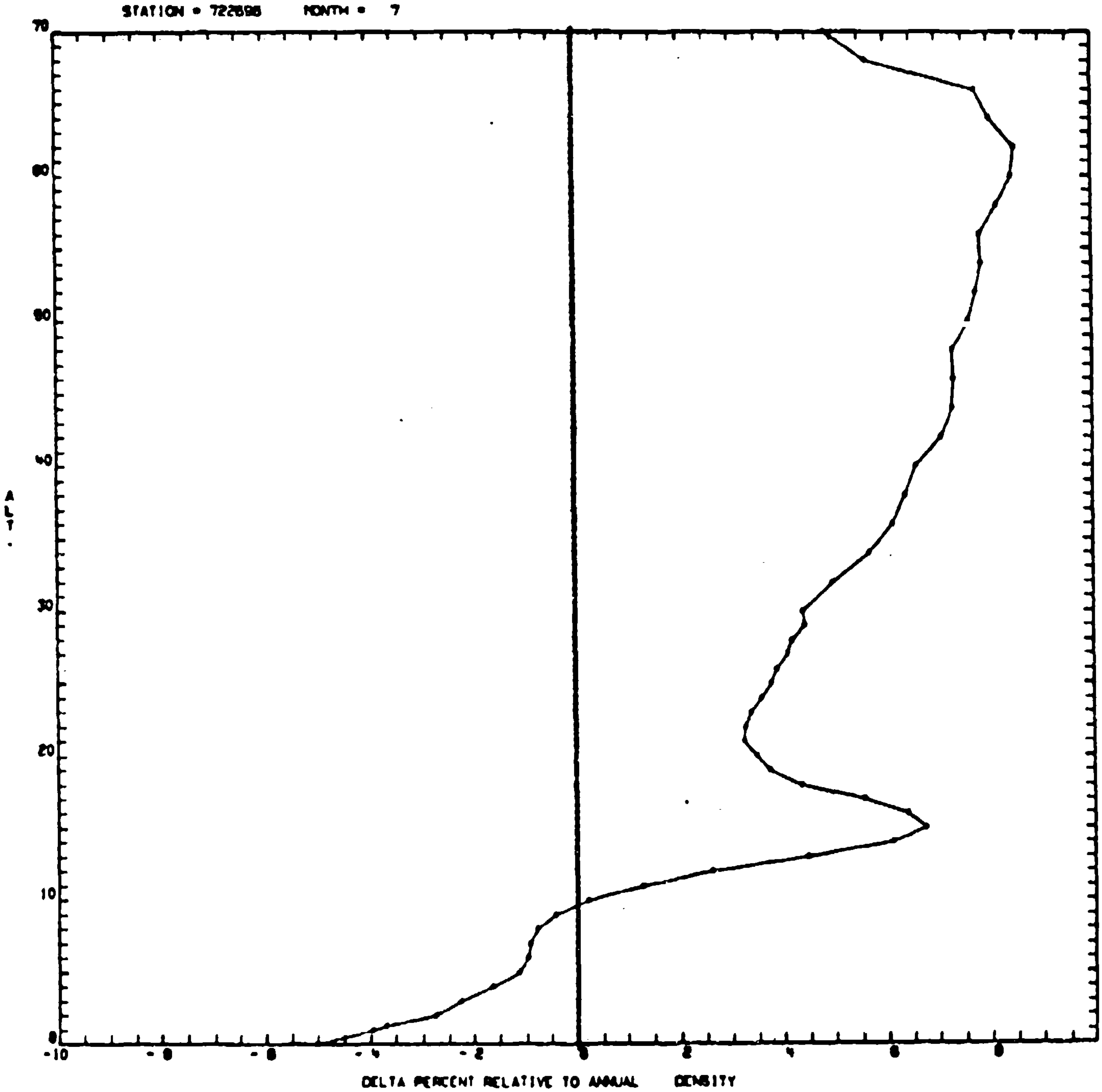

STATION = 722698 MONTH = 7
ALT.
DELTA PERCENT RELATIVE TO ANNUAL DENSITY

Figure B-6.

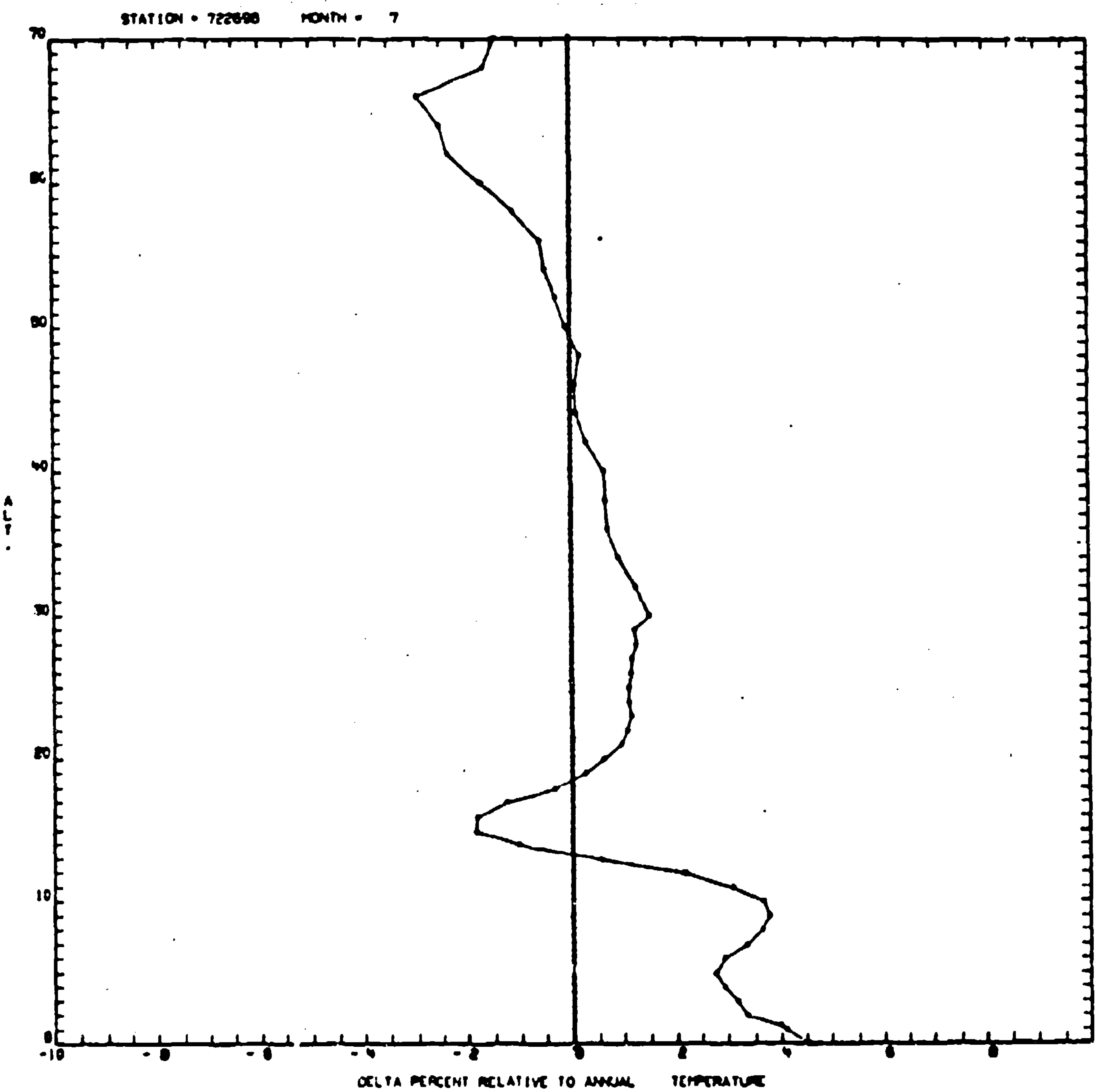

STATION = 722690 MONTH = 7
ALT
DELTA PERCENT RELATIVE TO ANNUAL TEMPERATURE

Figure B-7.

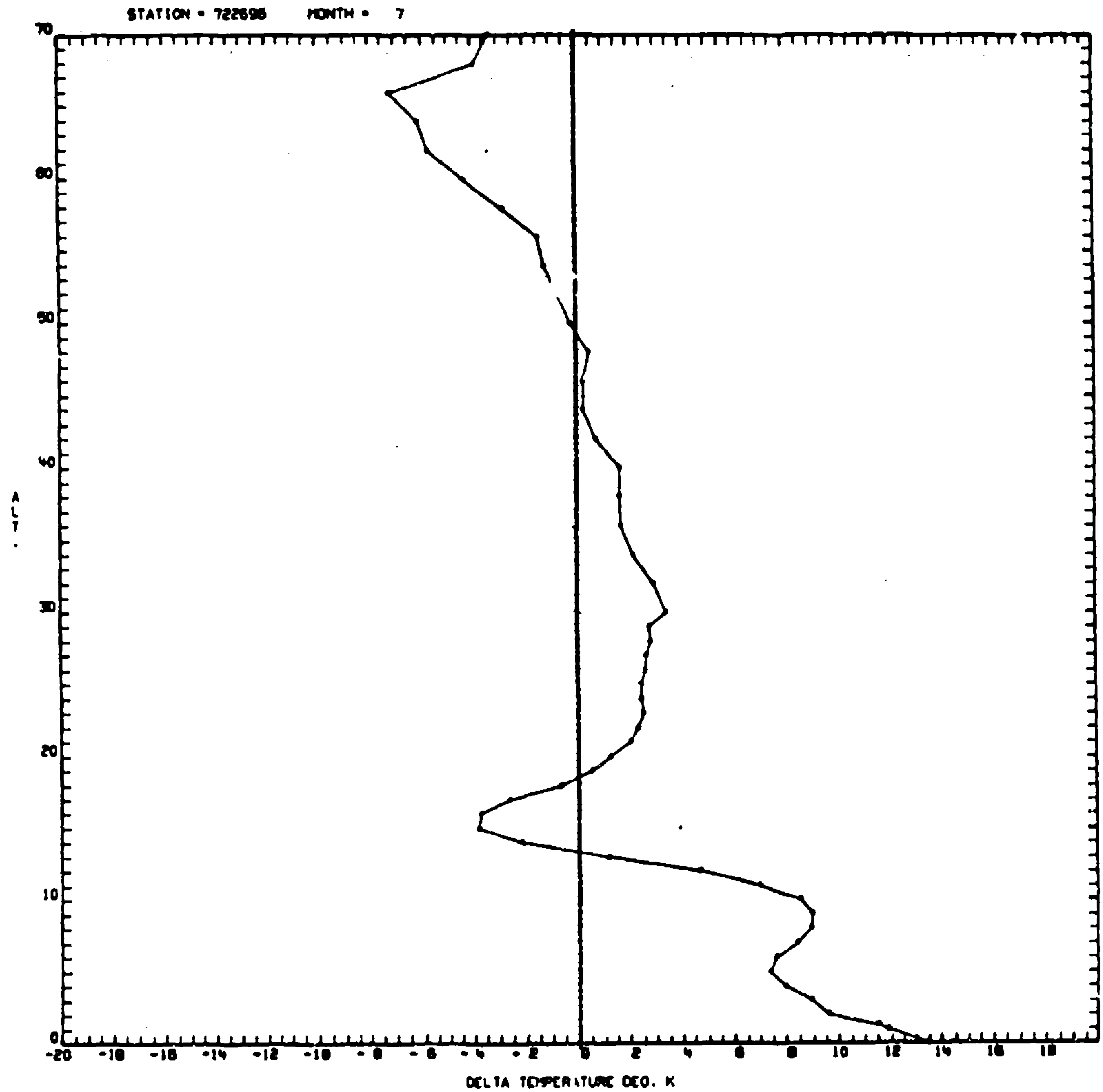
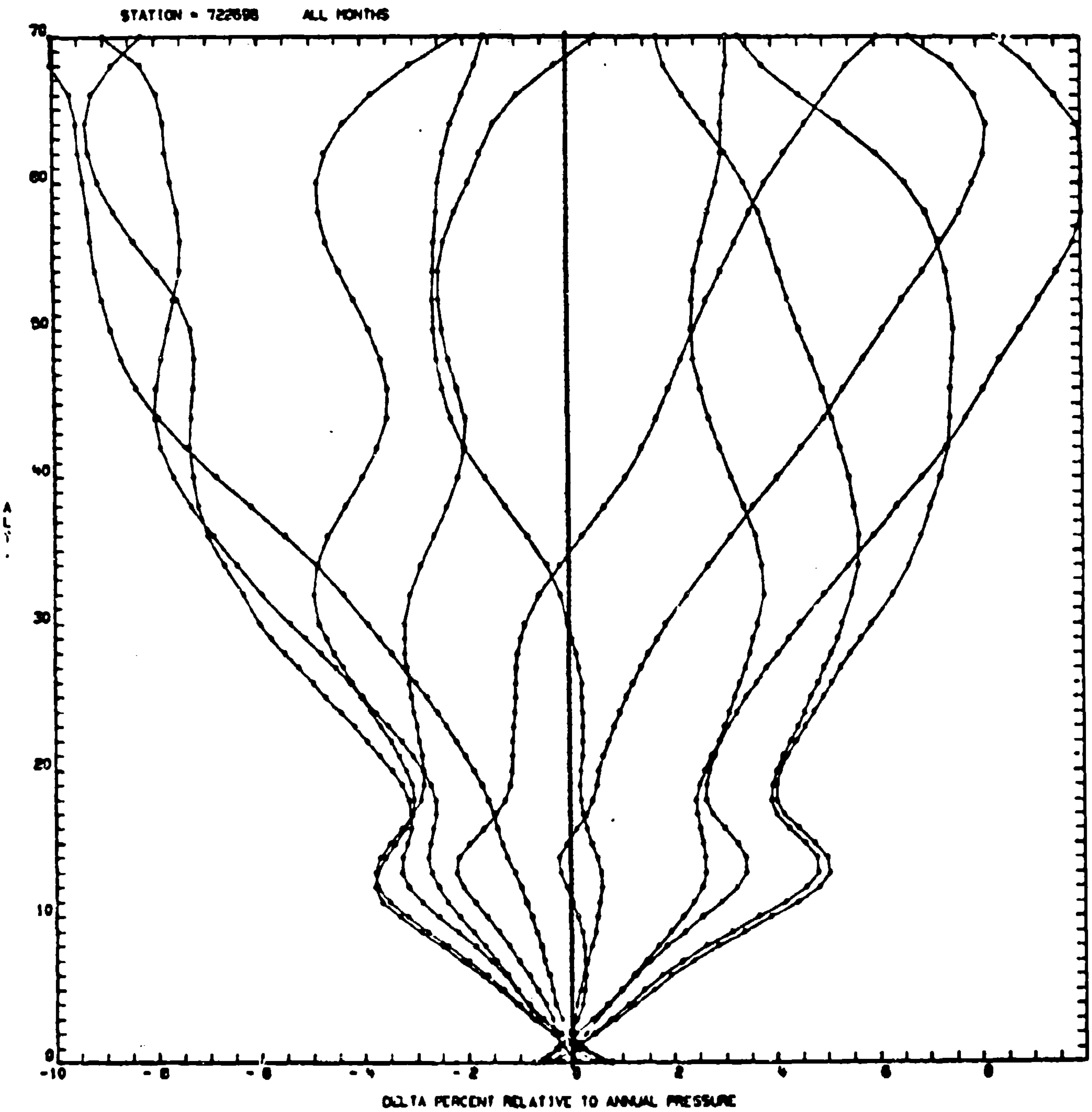


Figure B-8.



STATION = 722698 ALL MONTHS
ALT
DELTA PERCENT RELATIVE TO ANNUAL PRESSURE

Figure B-9.

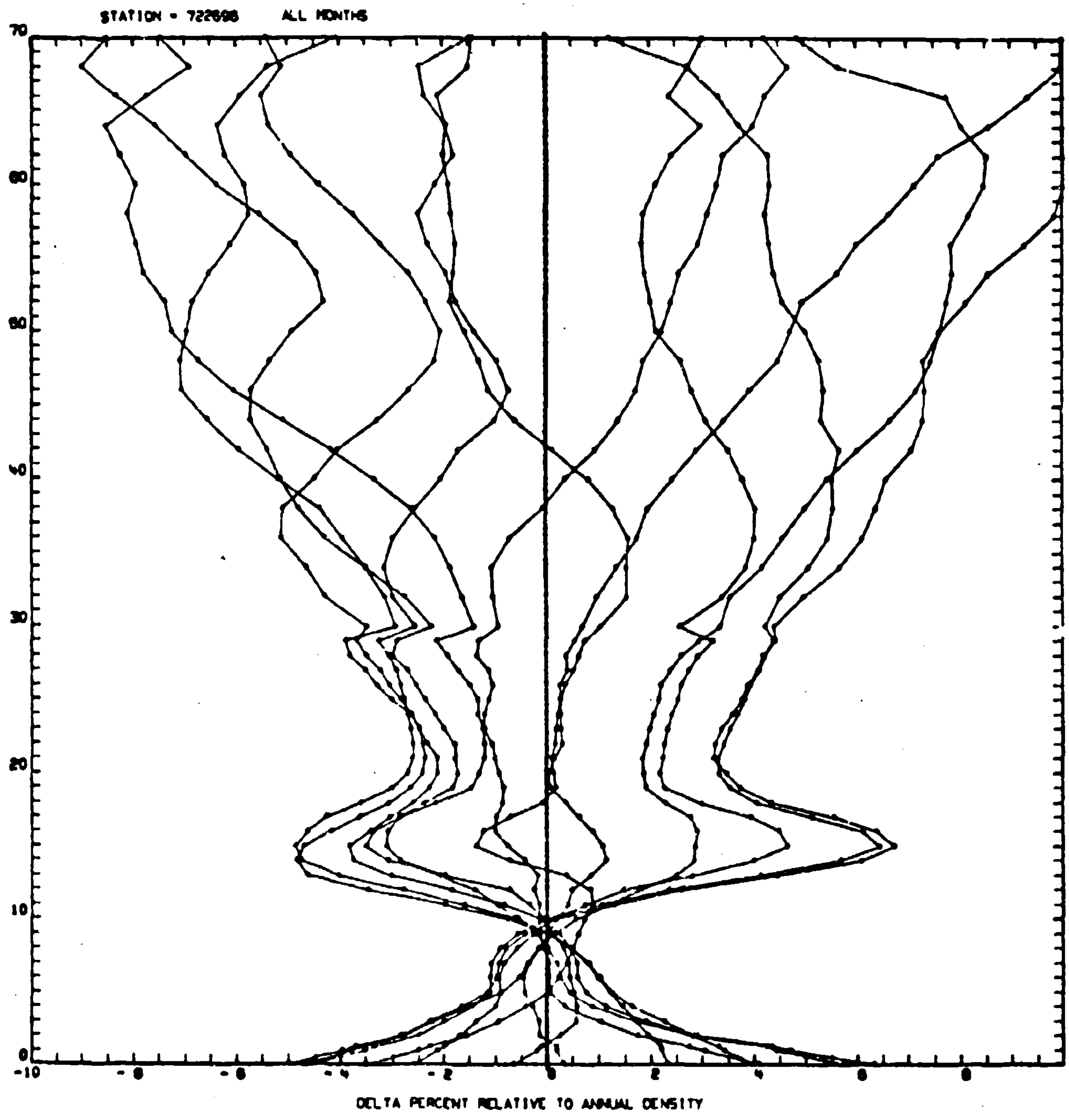

STATION = 722698 ALL MONTHS
ALT
DELTA PERCENT RELATIVE TO ANNUAL DENSITY

Figure B-10.

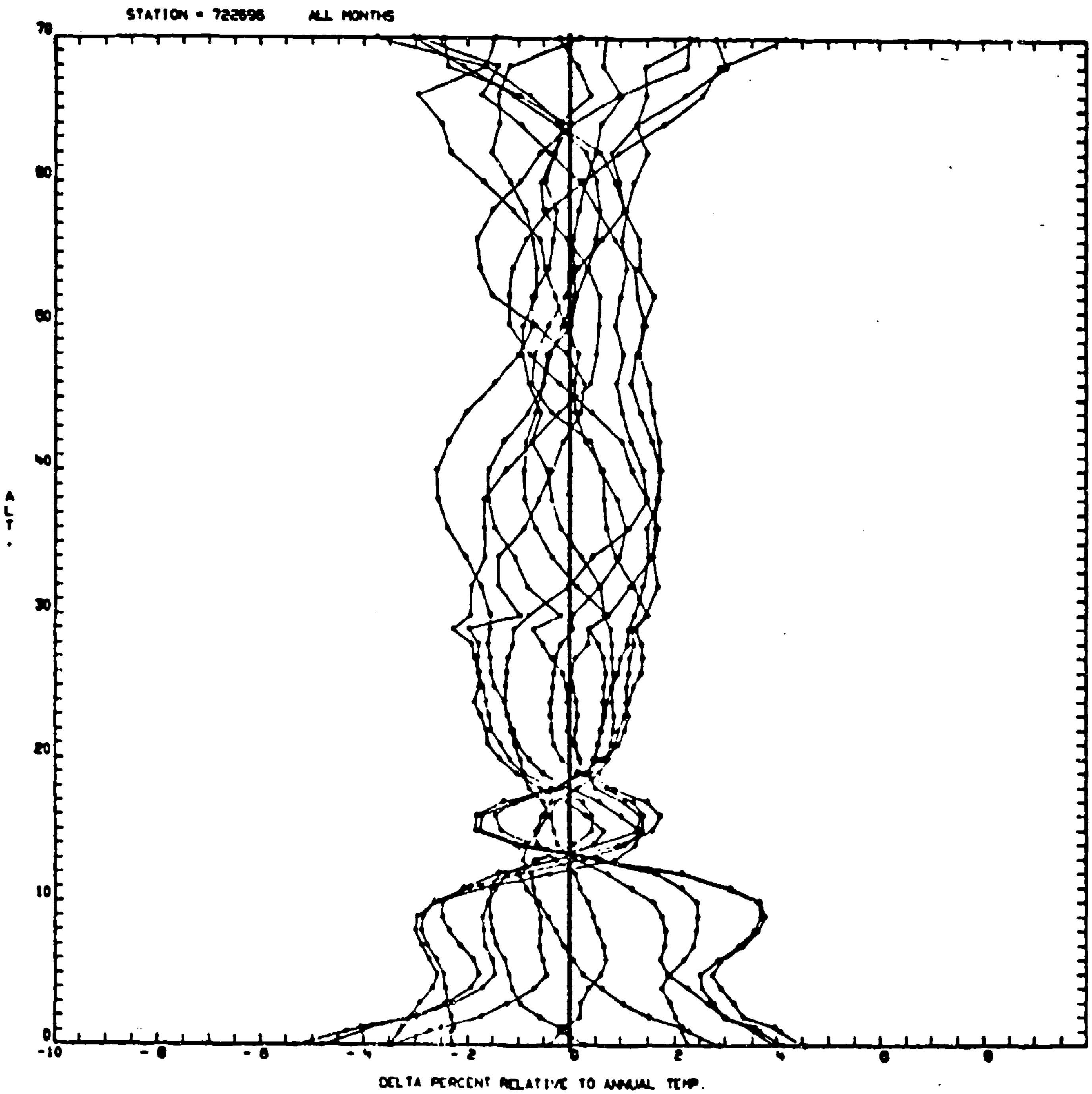

STATION = 722698 ALL MONTHS
70
60
50
40
30
20
10
0
ALT
-10
-8
-6
-4
-2
0
2
4
6
8
DELTA PERCENT RELATIVE TO ANNUAL TEMP.

Figure B-11.

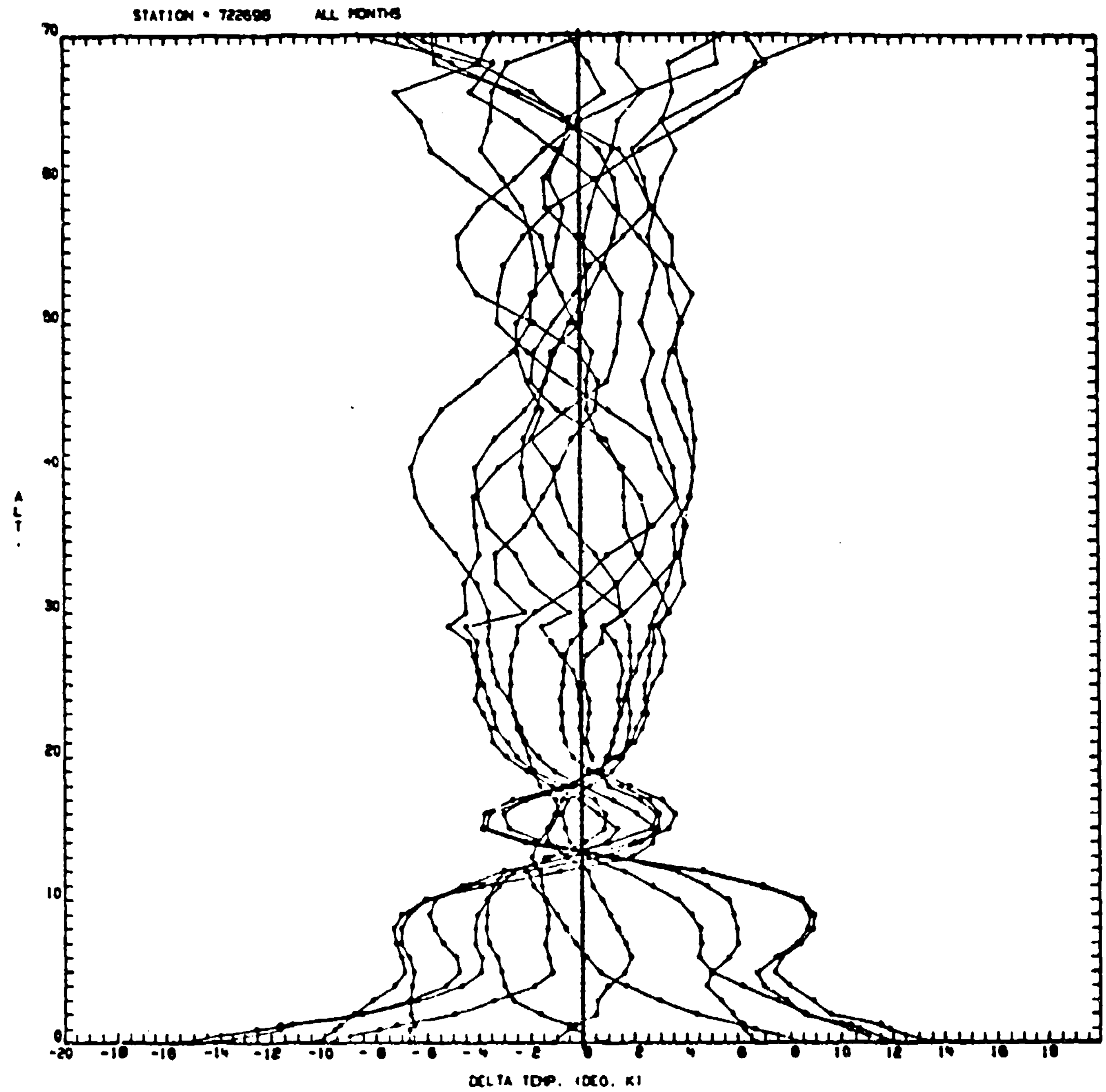


Figure B-12.

TABLE B-4.

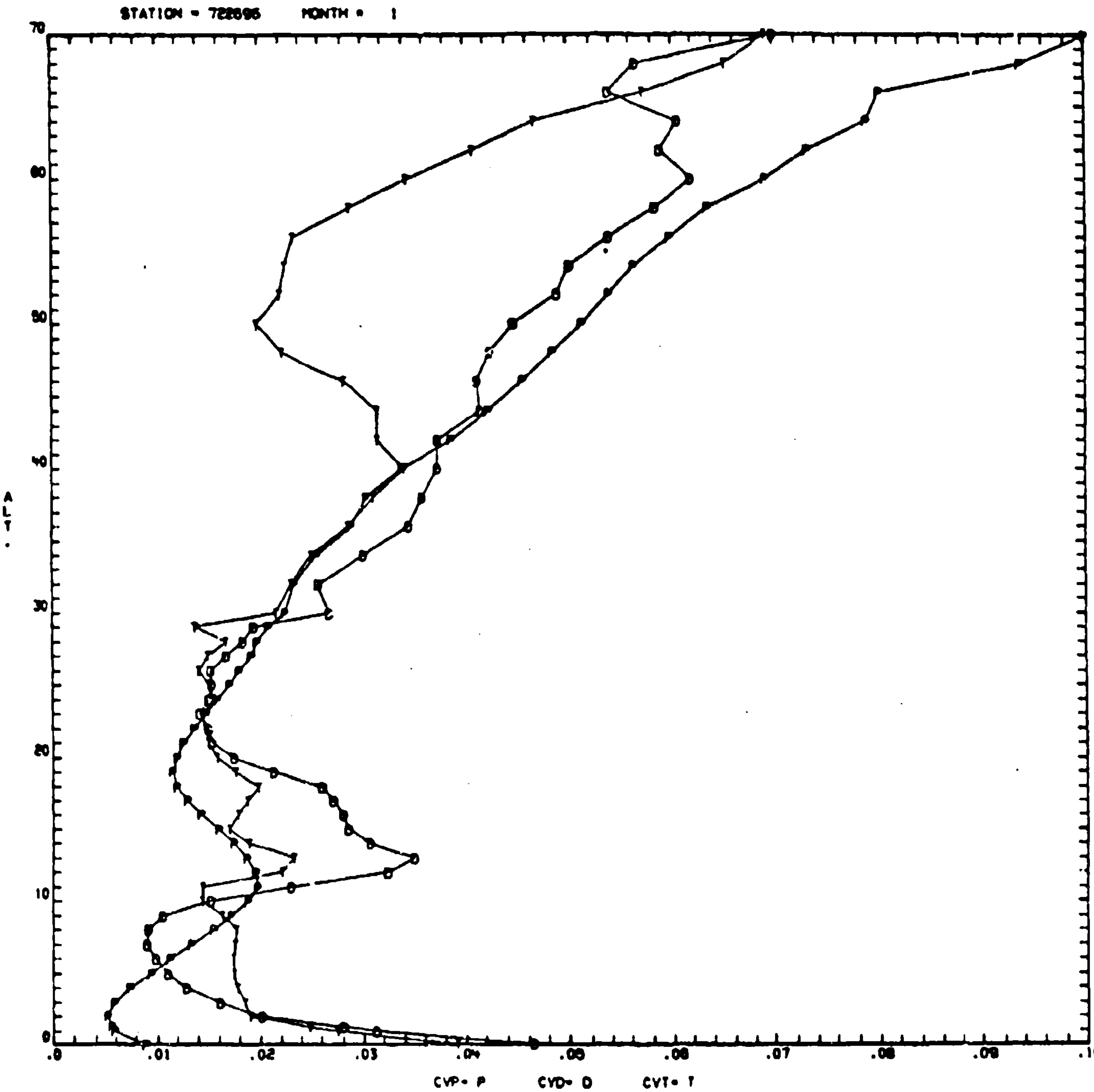
STATION 722698 MONTH 1

LEVEL	CVP	CVD	CVT	R(P,T)	R(P,D)	R(T,D)	DCVP	DCVD	DCVT
.000	.0089	.0485	.0391	-.7369	.8611	-.9933	-.0766	-.0015	-.0183
1.000	.0060	.0313	.0274	-.5835	.7020	-.9880	-.0528	-.0021	-.0098
1.246	.0056	.0280	.0249	-.4831	.6281	-.9847	-.0474	-.0025	-.0087
2.000	.0052	.0201	.0191	-.0791	.3279	-.9667	-.0341	-.0041	-.0062
3.000	.0059	.0161	.0185	.5483	-.2638	-.9512	-.0287	-.0084	-.0035
4.000	.0075	.0128	.0178	.7800	-.4975	-.9309	-.0231	-.0124	-.0025
5.000	.0095	.0111	.0175	.8272	-.4957	-.8771	-.0191	-.0159	-.0030
6.000	.0113	.0098	.0174	.8498	-.3580	-.7965	-.0159	-.0188	-.0037
7.000	.0134	.0090	.0177	.8662	-.2145	-.6738	-.0133	-.0220	-.0047
8.000	.0154	.0091	.0177	.8571	.0313	-.4881	-.0114	-.0240	-.0069
9.000	.0172	.0106	.0164	.8033	.3758	-.2458	-.0098	-.0230	-.0113
10.000	.0189	.0152	.0144	.6117	.6609	-.1894	-.0107	-.0181	-.0196
11.000	.0198	.0231	.0144	.1178	.7842	-.5238	-.0177	-.0111	-.0284
12.000	.0195	.0324	.0221	-.2071	.7451	-.8058	-.0349	-.0093	-.0299
13.000	.0187	.0349	.0233	-.3694	.7839	-.8666	-.0395	-.0072	-.0303
14.000	.0175	.0307	.0190	-.4180	.8278	-.8557	-.0322	-.0058	-.0292
15.000	.0160	.0285	.0170	-.4890	.8533	-.8721	-.0295	-.0045	-.0275
16.000	.0143	.0280	.0179	-.5094	.8352	-.8987	-.0316	-.0042	-.0244
17.000	.0130	.0272	.0188	-.4409	.7839	-.9029	-.0330	-.0046	-.0214
18.000	.0121	.0261	.0199	.2904	.6834	-.8970	-.034[illegible]	-.0059	-.0183
19.000	.0116	.0212	.0177	[illegible]	.5518	-.8371	-.0273	-.0081	-.0151
20.000	.0120	.0175	.0158	.2329	.4742	-.7458	-.0213	-.0103	-.0138
21.000	.0126	.0153	.0150	[illegible]	.4373	-.6543	-.0177	-.0123	-.0129
22.000	.0137	.0150	.0147	.4409	.4761	-.5793	-.0161	-.0134	-.0140
23.000	.0148	.0142	.0145	.5332	.5019	-.4649	-.0138	-.0152	-.0145
24.000	.0158	.0150	.0157	.5452	.4866	-.4671	-.0148	-.0165	-.0152
25.000	.0171	.0153	.0151	.5537	.5688	-.3699	-.0133	-.0169	-.0173
26.000	.0180	.0152	.0141	.5762	.6523	-.2437	-.0113	-.0169	-.0191
27.000	.0193	.0167	.0150	.5473	.6618	-.2653	-.0125	-.0175	-.0210
28.000	.0198	.0185	.0168	.5001	.6171	-.3728	-.0155	-.0181	-.0215
29.000	.0208	.0194	.0138	.4289	.7667	-.2511	-.0124	-.0152	-.0265
30.000	.0225	.0269	.0215	.2570	.6324	-.5861	-.0259	-.0172	-.0278
32.000	.0234	.0258	.0231	.3854	.5624	-.5463	-.0255	-.0207	-.0261
34.000	.0257	.0301	.0252	.2987	.6028	-.5814	-.0296	-.0207	-.0306
36.000	.0289	.0345	.0286	.2792	.6051	-.5955	-.0342	-.0230	-.0348
38.000	.0305	.0359	.0312	.3233	.5695	-.5936	-.0365	-.0258	-.0352
40.000	.0340	.0374	.0340	.3976	.5487	-.5489	-.0374	-.0307	-.0374
42.000	.0388	.0374	.0316	.4512	.6570	-.3763	-.0301	-.0330	-.0446
44.000	.0424	.0415	.0317	.4015	.7156	-.3524	-.0307	-.0326	-.0523
46.000	.0456	.0413	.0282	.4560	.7934	-.1799	-.0239	-.0328	-.0587
48.000	.0485	.0425	.0222	.4822	.8893	.0282	-.0162	-.0282	-.0688
50.000	.0513	.0447	.0198	.5033	.9239	.1344	-.0132	-.0264	-.0762
52.000	.0538	.0489	.0220	.4171	.9128	.0094	-.0171	-.0269	-.0807
54.000	.0563	.0500	.0225	.4631	.9174	.0722	-.0162	-.0287	-.0838
56.000	.0597	.0538	.0233	.4337	.9209	.0482	-.0174	-.0291	-.0902
58.000	.0635	.0583	.0287	.3978	.8921	-.0595	-.0238	-.0339	-.0931
60.000	.0691	.0619	.0343	.4493	.8608	-.0521	-.0270	-.0416	-.0967
62.000	.0731	.0589	.0408	.5943	.8302	.0450	-.0268	-.0551	-.0912
64.000	.0789	.0605	.0468	.6427	.8062	.0649	-.0284	-.0651	-.0927
66.000	.0801	.0538	.0572	.7414	.7003	.0401	-.0309	-.0836	-.0787
68.000	.0939	.0566	.0653	.8051	.7299	.1822	-.0280	-.1025	-.0852
70.000	.1180	.0700	.0691	.8464	.8507	.4401	-.0211	-.1171	-.1189

TABLE B-5.

STATION 722698 MONTH 7

LEVEL	CVP	CVD	CVT	R(P,T)	R(P,D)	R(T,D)	DCVP	DCVD	DCVT
.000	.0041	.0227	.0198	-.6517	.7498	-.9905	-.0384	-.0012	-.0070
1.000	.0029	.0154	.0139	-.4387	.5853	-.9894	-.0264	-.0014	-.0044
1.246	.0027	.0139	.0126	-.3830	.5449	-.9833	-.0237	-.0015	-.0040
2.000	.0023	.0102	.0091	-.3659	.5550	-.9772	-.0169	-.0012	-.0034
3.000	.0022	.0080	.0077	-.0336	.3013	-.9631	-.0135	-.0018	-.0025
4.000	.0023	.0059	.0061	.2772	.1069	-.9257	-.0096	-.0025	-.0021
5.000	.0025	.0047	.0050	.3818	.1249	-.8693	-.0072	-.0029	-.0022
6.000	.0028	.0052	.0057	.4138	.0849	-.8720	-.0082	-.0033	-.0023
7.000	.0032	.0049	.0058	.5379	.0138	-.8355	-.0075	-.0041	-.0023
8.000	.0036	.0051	.0062	.5771	.0022	-.8154	-.0077	-.0047	-.0024
9.000	.0042	.0051	.0069	.6780	-.0885	-.7921	-.0078	-.0061	-.0024
10.000	.0049	.0052	.0075	.7343	-.1263	-.7661	-.0078	-.0073	-.0025
11.000	.0057	.0048	.0078	.7860	-.0808	-.6797	-.0069	-.0086	-.0028
12.000	.0064	.0042	.0068	.7960	.2351	-.4012	-.0048	-.0090	-.0038
13.000	.0070	.0059	.0064	.6160	.5189	-.3537	-.0053	-.0075	-.0065
14.000	.0076	.0086	.0073	.3400	.5971	-.5513	-.0083	-.0063	-.0089
15.000	.0078	.0118	.0095	.0781	.5984	-.7537	-.0135	-.0055	-.0101
16.000	.0079	.0124	.0091	-.0587	.6824	-.7698	-.0136	-.0046	-.0113
17.000	.0077	.0125	.0090	-.1251	.7036	-.7930	-.0138	-.0041	-.0112
18.000	.0076	.0127	.0094	-.1031	.6751	-.8034	-.0145	-.0043	-.0109
19.000	.0076	.0113	.0082	-.0364	.6945	-.7443	-.0119	-.0044	-.0108
20.000	.0076	.0096	.0078	.1989	.6358	-.6299	-.0098	-.0056	-.0097
21.000	.0080	.0097	.0080	.2618	.6100	-.6051	-.0097	-.0063	-.0097
22.000	.0084	.0087	.0071	.3752	.6620	-.4464	-.0074	-.0068	-.010.
23.000	.0088	.0085	.0070	.4374	.6762	-.3667	-.0067	-.0072	-.0103
24.000	.0094	.0087	.0073	.4771	.6745	-.3271	-.0067	-.0080	-.0107
25.000	.0093	.0092	.0075	.4657	.6937	-.3144	-.0068	-.0081	-.0116
26.000	.0104	.0100	.0079	.4375	.6995	-.3366	-.0074	-.0084	-.0125
27.000	.0110	.0111	.0087	.3821	.6897	-.4056	-.0089	-.0086	-.0134
28.000	.0116	.0102	.0084	.5214	.7075	-.2341	-.0070	-.0099	-.0134
29.000	.0129	.0111	.0099	.5482	.6674	-.2569	-.0082	-.0118	-.0141
30.000	.0165	.0200	.0168	.2757	.5926	-.6108	-.0203	-.0133	-.0198
32.000	.0178	.0159	.0135	.5153	.6841	-.2726	-.0116	-.0155	-.0202
34.000	.0212	.0197	.0151	.4494	.7278	-.2856	-.0137	-.0166	-.0257
36.000	.0222	.0209	.0175	.4658	.6724	-.3419	-.0162	-.0188	-.0256
38.000	.0241	.0249	.0187	.3428	.7103	-.4177	-.0195	-.0178	-.0303
40.000	.0267	.0274	.0199	.3366	.7291	-.3991	-.0208	-.0192	-.0342
42.000	.0281	.0232	.0178	.5676	.7756	-.0795	-.0129	-.0227	-.0338
44.000	.0308	.0264	.0158	.5075	.8573	-.0085	-.0115	-.0200	-.0412
46.000	.0326	.0288	.0160	.4698	.8712	-.0241	-.0122	-.0198	-.0453
48.000	.0348	.0312	.0163	.4459	.8833	-.0257	-.0127	-.0200	-.0497
50.000	.0371	.0315	.0161	.5351	.9023	.1187	-.0106	-.0216	-.0525
52.000	.0382	.0359	.0175	.3602	.8906	-.1034	-.0151	-.0199	-.0568
54.000	.0395	.0374	.0196	.3502	.8720	-.1532	-.0175	-.0216	-.0574
56.000	.0408	.0357	.0236	.4925	.8177	-.0983	-.0185	-.0287	-.0529
58.000	0445	.0361	.0256	.5847	.8184	.0122	-.0172	-.0340	-.0550
60.000	.0474	.0397	.0286	.5510	.7982	-.0629	-.0209	-.0364	-.0585
62.000	.0526	.0429	.0352	.5851	.7464	-.1030	-.0255	-.0449	-.0603
64.000	.0553	.0453	.0450	.6083	.8155	-.2511	-.0351	-.0550	-.0558
66.000	.0565	.0445	.0528	.6698	.4748	-.3357	-.0408	-.0647	-.0483
68.000	.0751	.0561	.0649	.6880	.5424	-.2366	-.0459	-.0839	-.0662
70.000	.8945	.0710	.0721	.6672	.6537	-.1276	-.0486	-.0957	-.0934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60
50
40
30
20
10
0
ALT
.0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.10
CVP= P
CVD= D
CVT= T

Figure B-13.

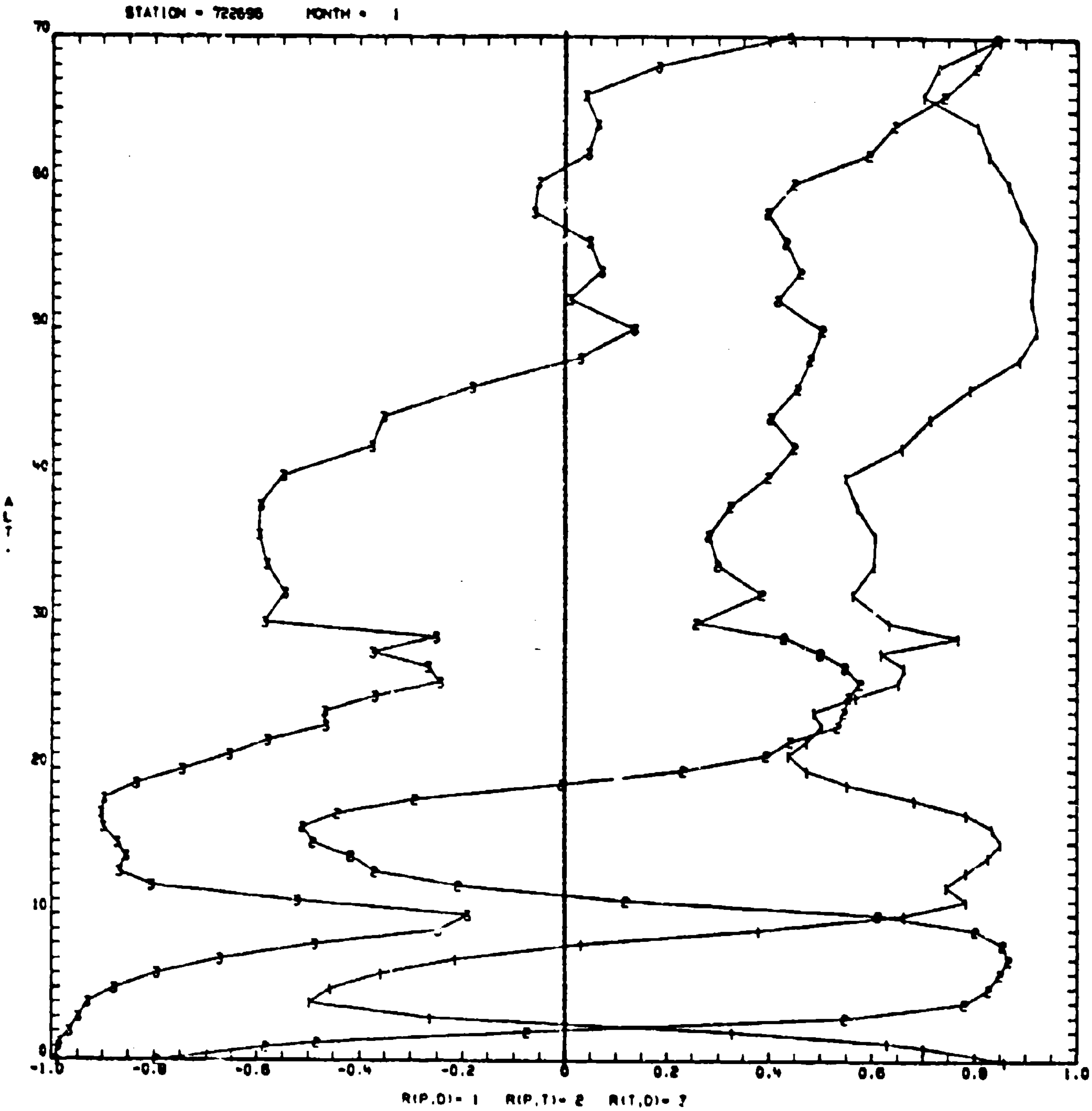


Figure B-14.

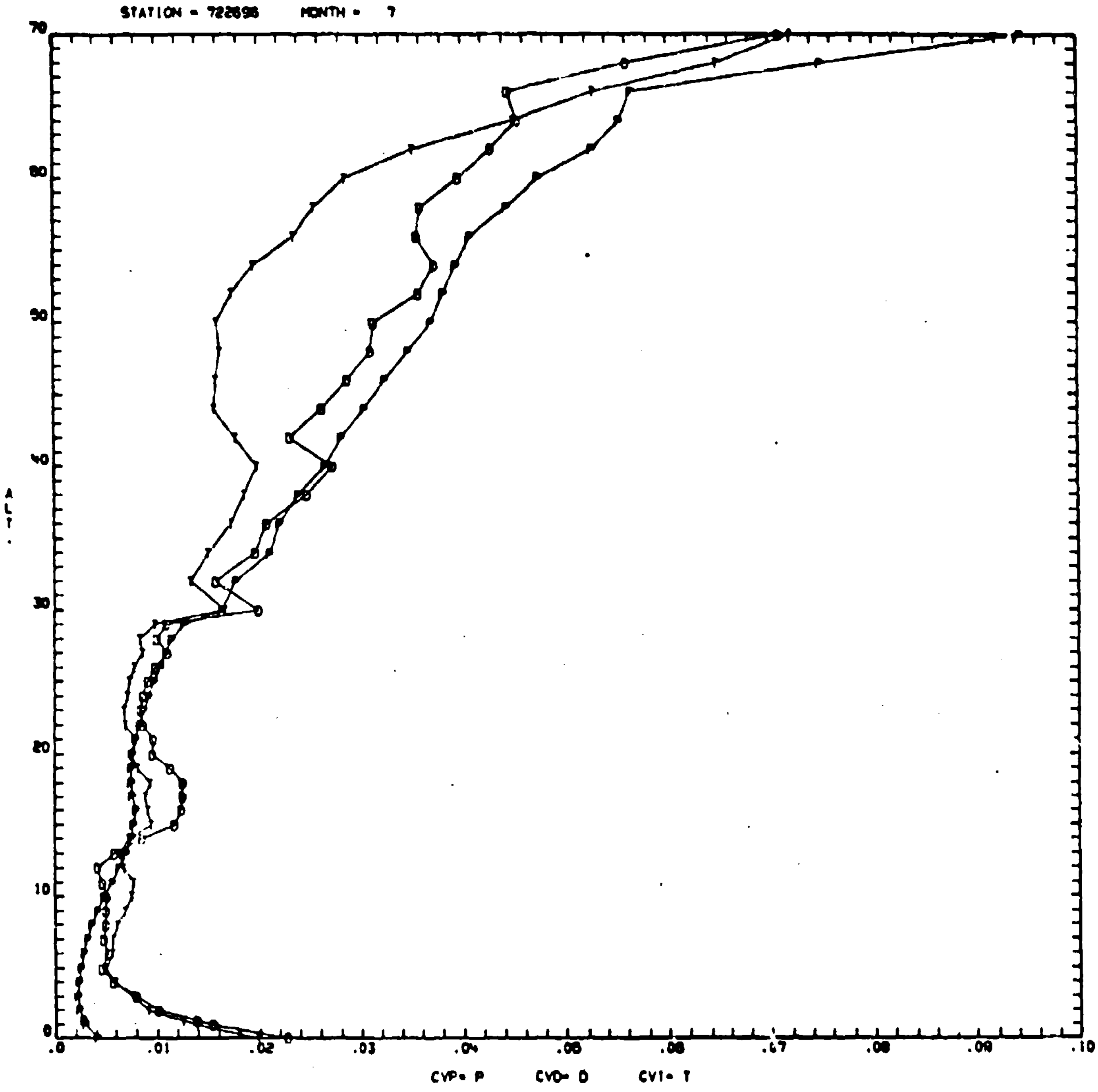


Figure B-15.

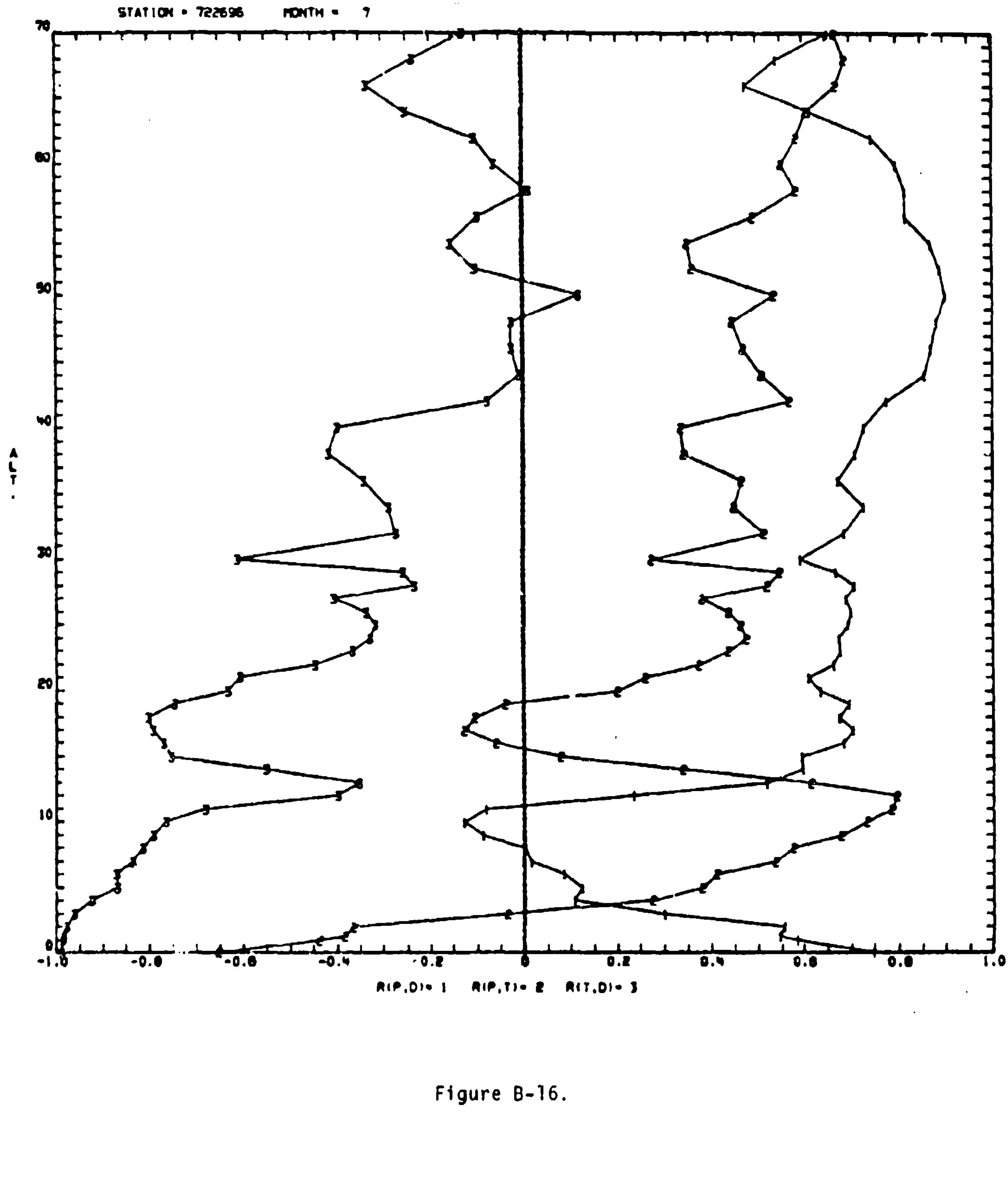


Figure B-16.

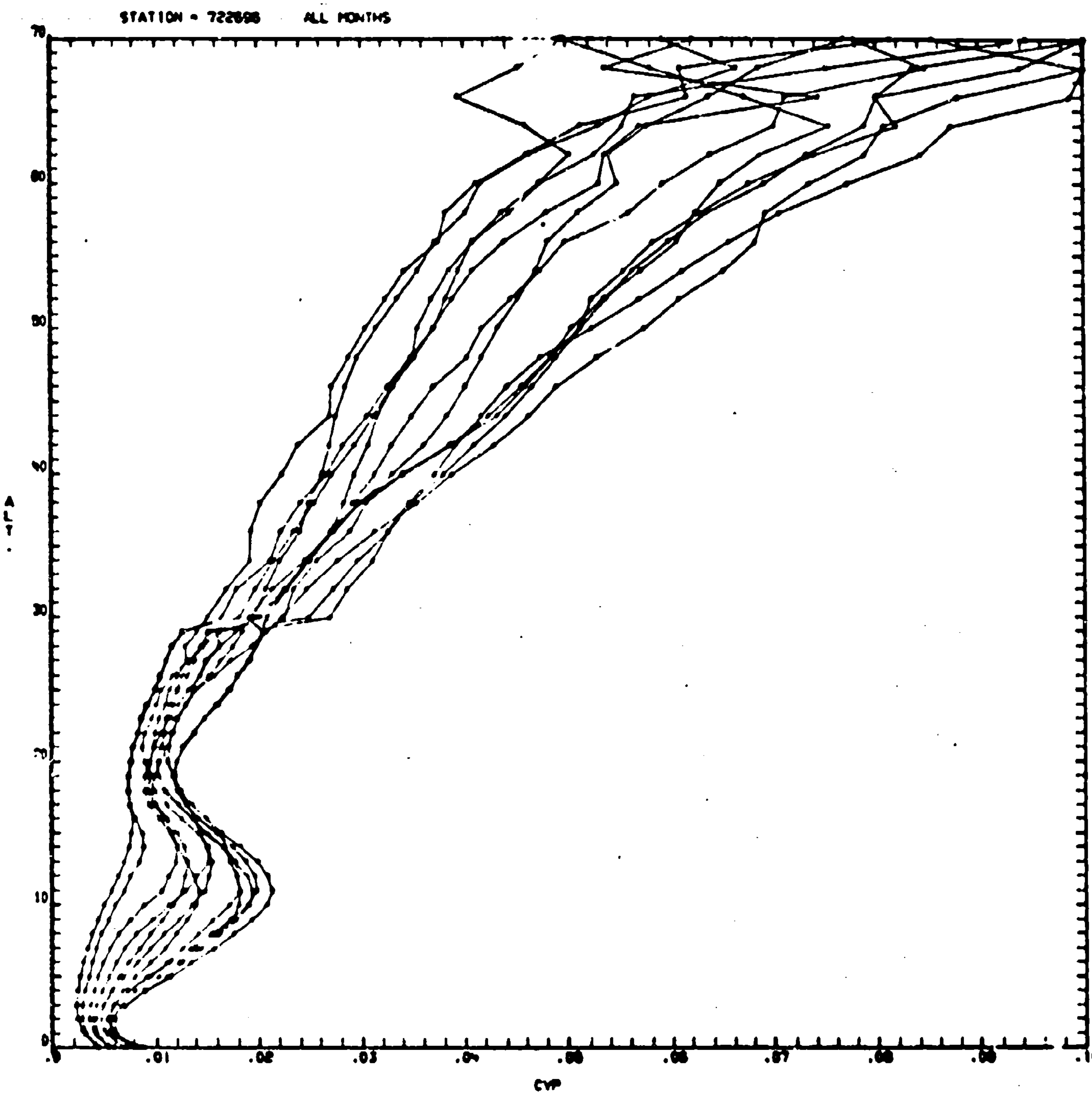


Figure B-17.

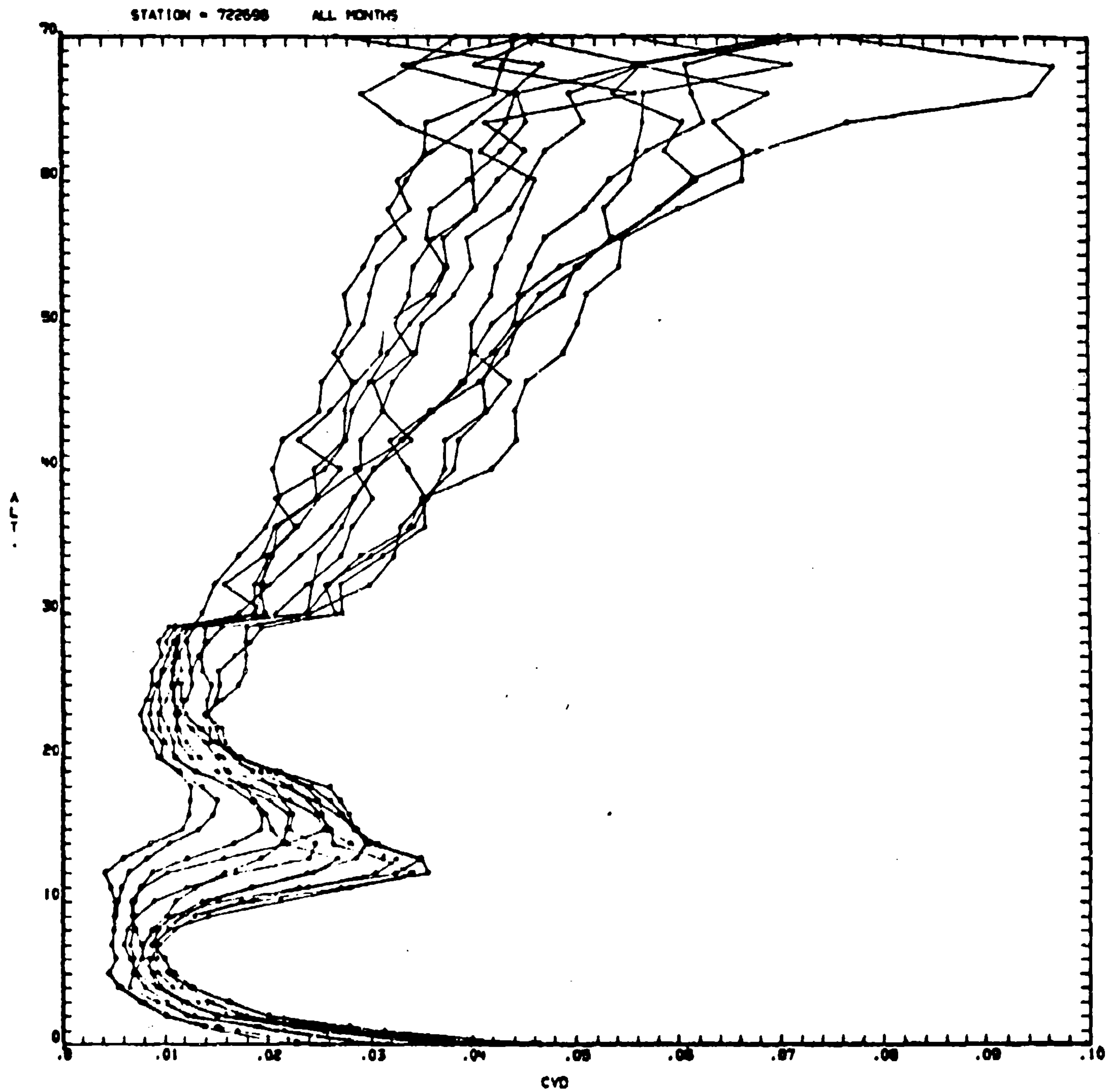
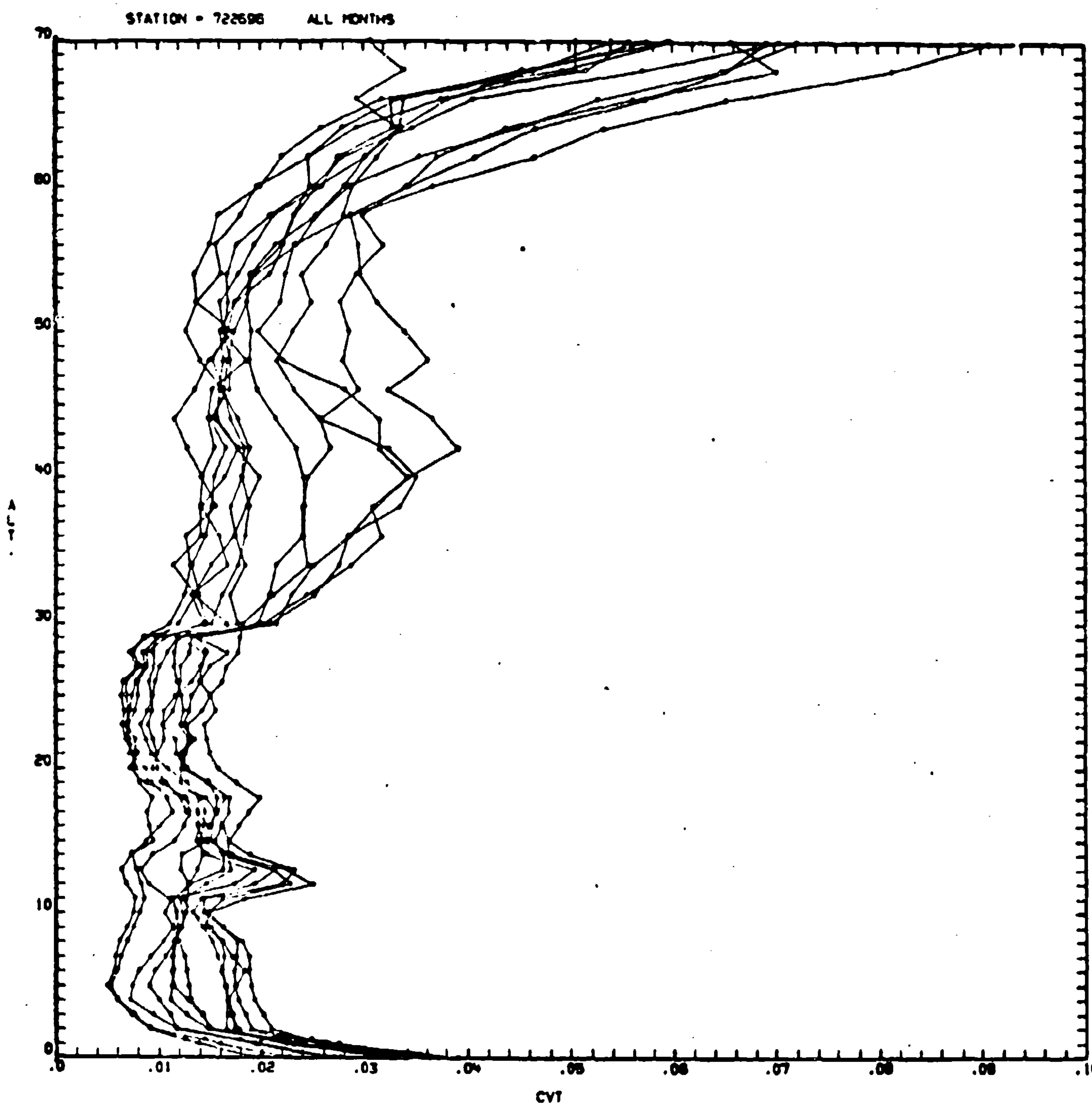


Figure B-18.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70
60
50
40
30
20
10
0
ALT
.0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.10
CVT

Figure B-19.

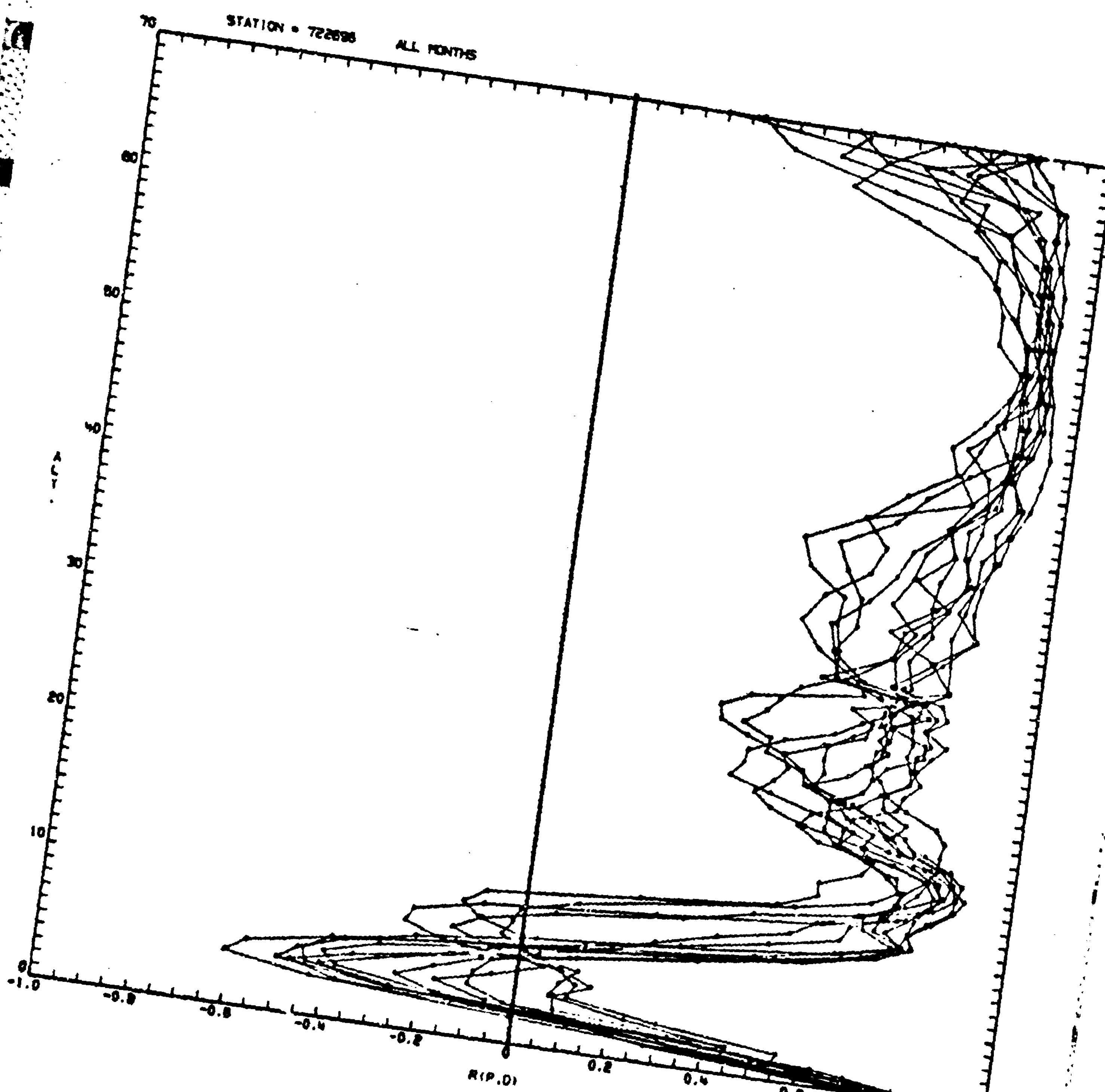

Figure B-20.

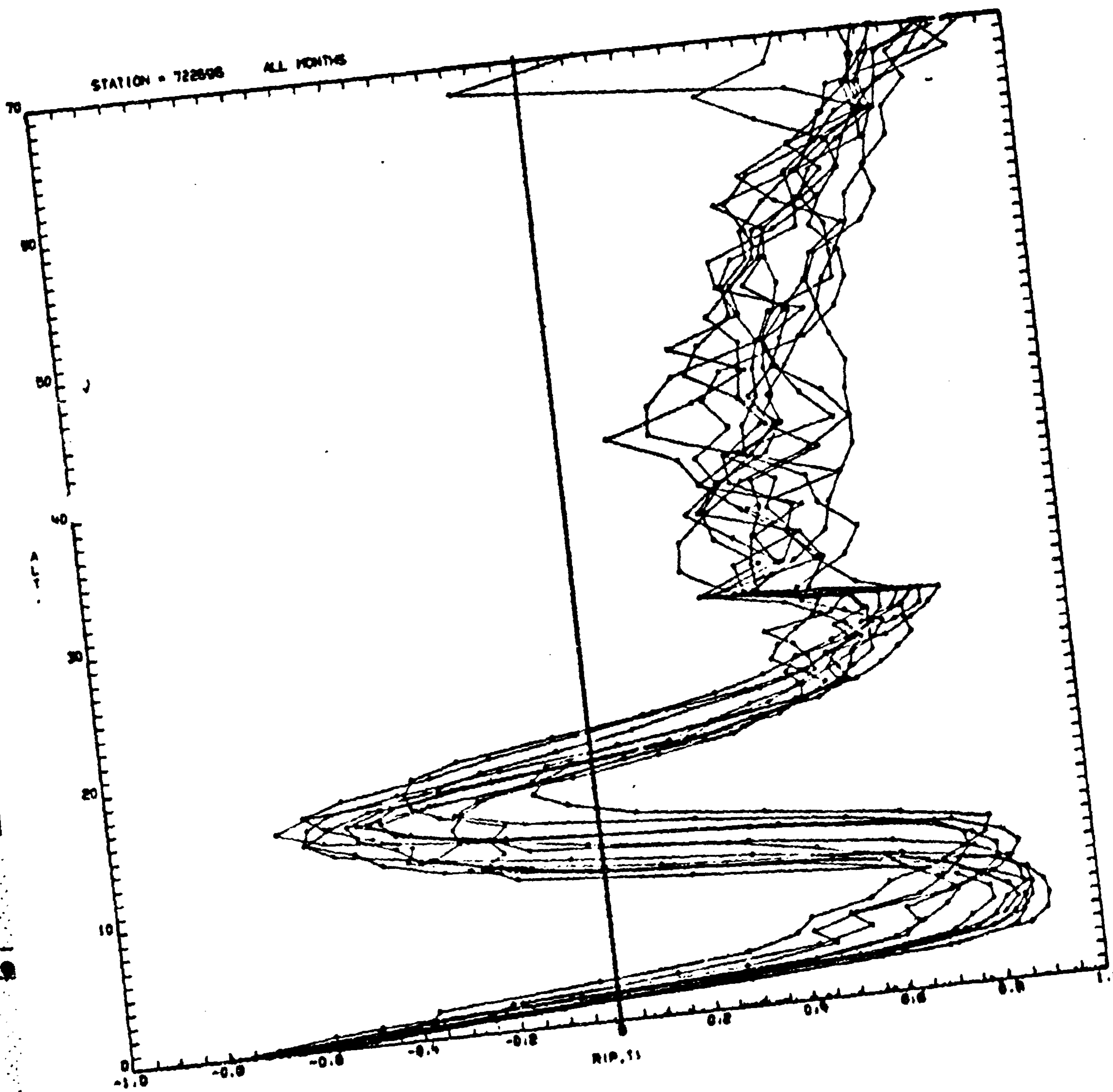
STATION = 722606 ALL MONTHS
70
60
50
40
30
20
10
0
ALT
-1.0
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1.0
RIP,T1

Figure B-21.

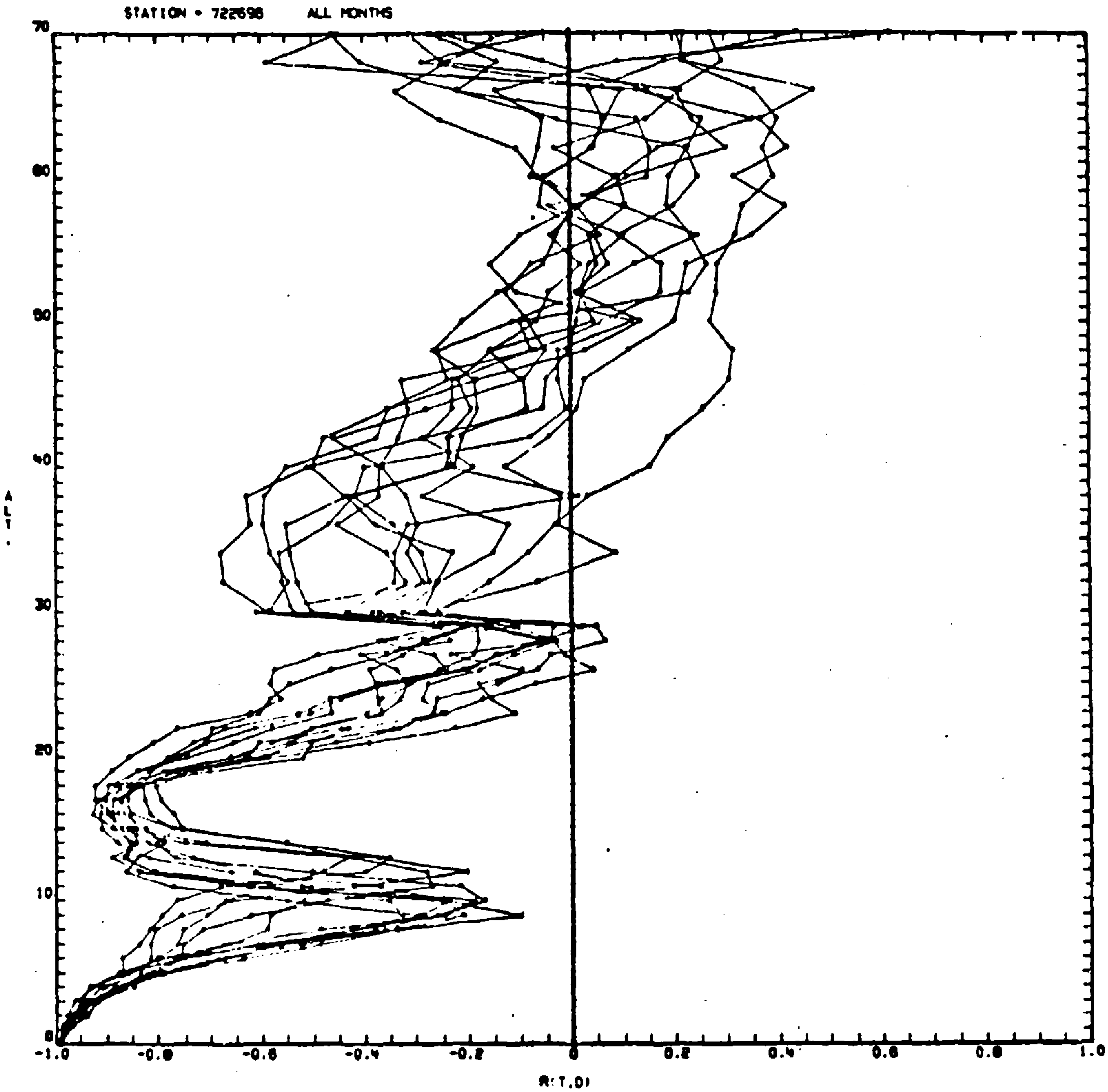
STATION = 722698 ALL MONTHS
70
60
50
40
30
20
10
0
ALT
-1.0
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1.0
R(T,D)

Figure B-22.